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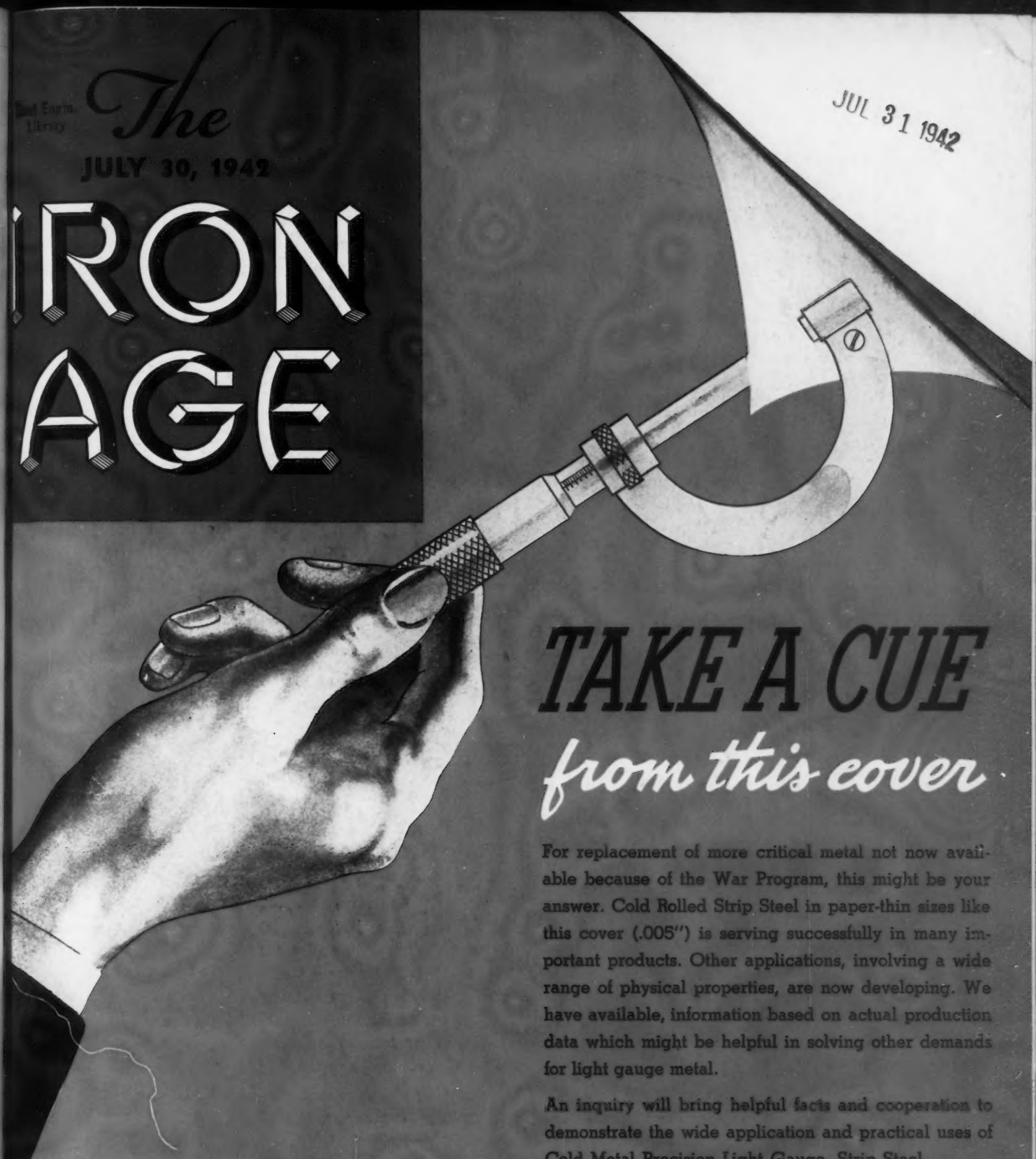
JUL 31 1942

The
JULY 30, 1942
IRON AGE



TAKE A CUE
from this cover

For replacement of more critical metal not now available because of the War Program, this might be your answer. Cold Rolled Strip Steel in paper-thin sizes like this cover (.005") is serving successfully in many important products. Other applications, involving a wide range of physical properties, are now developing. We have available, information based on actual production data which might be helpful in solving other demands for light gauge metal.

An inquiry will bring helpful facts and cooperation to demonstrate the wide application and practical uses of Cold Metal Precision Light Gauge Strip Steel.

C M P
PRECISION COLD ROLLED
STRIP STEEL

THE COLD METAL
PRODUCTS CO.

SUBSIDIARY OF THE COLD METAL PROCESS CO. · YOUNGSTOWN, OHIO

Cleveland owners give you

THE LOW-DOWN

"You've certainly come to the right place to get the low-down on Cleveland Worm Gear Speed Reducers" cordially remarks the Manager of a Midwest plant, "because we have used a lot of them over a good many years.

1—"*We bought fifty Clevelands* on our first order, nearly 20 years ago. That was a big initial order for those days, but we needed 50 and were confident that Cleveland made a very superior Drive.

2—"Since then, we have ordered additional Clevelands repeatedly.

3—"Cleveland Drives operate our machines uniformly. Smoothness is vital to our grinding and polishing processes.

4—"We have no shutdowns due to Drive failure."

Cleveland has devoted its entire 30 years to producing worms and gears and nothing else. Their good qualities have led this and many another manufacturer to order more Clevelands—dozens or hundreds—after the first purchase.

The Cleveland Worm & Gear Company, 3252 East 80th Street, Cleveland, Ohio.

Affiliate: The Farval Corporation, Cleveland, Manufacturers of Centralized Systems of Lubrication.
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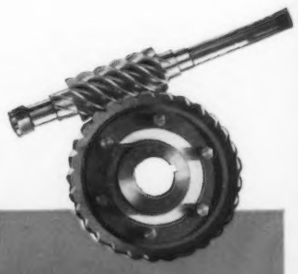

CLEVELAND WORM GEAR *Speed Reducers*

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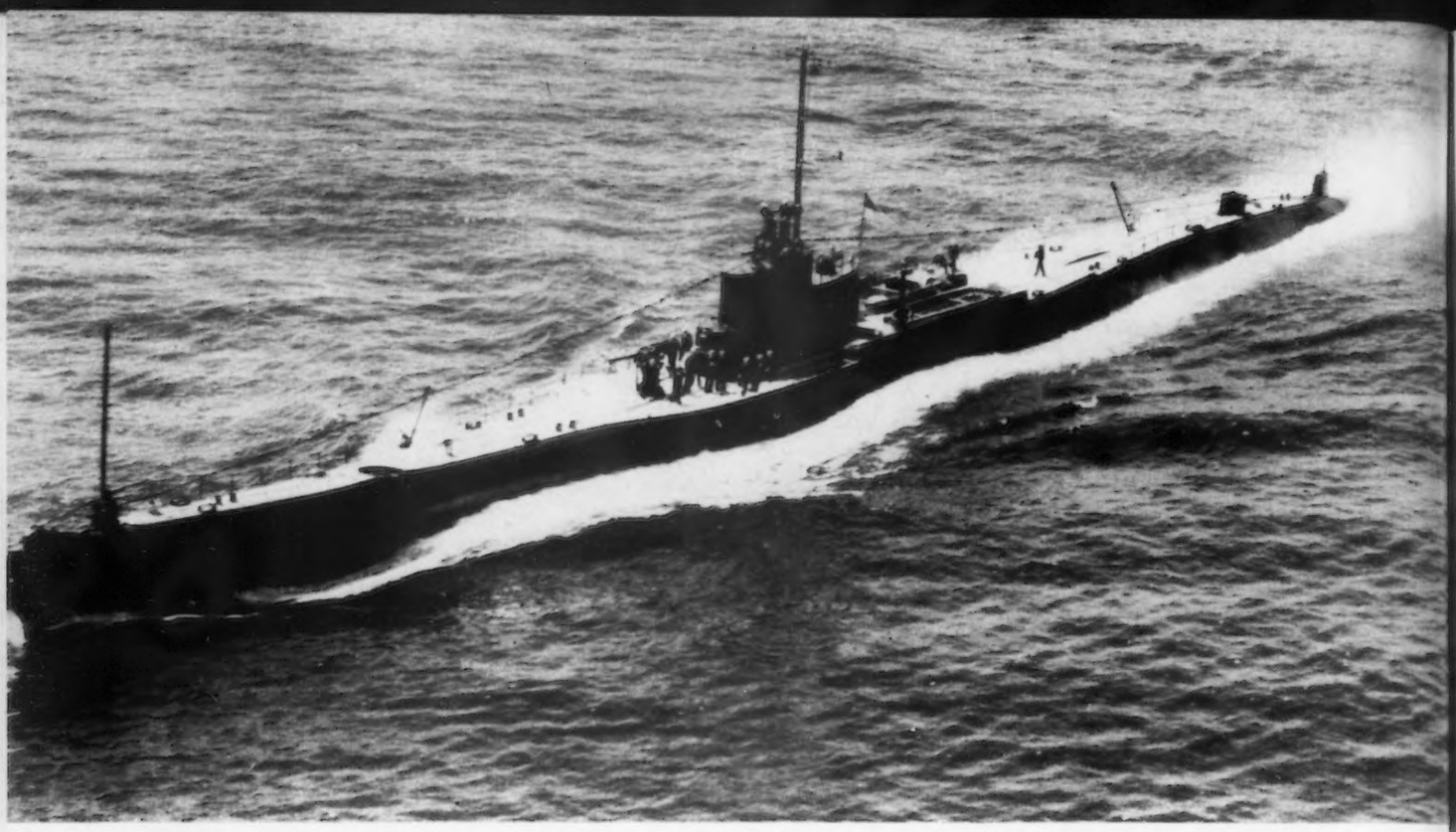

Sub Propeller Shafts Needed Quickly!

Story of How Ryerson Ingenuity Saved Five Weeks

URGENTLY needed at a distant shipyard were fourteen forged submarine propeller shafts that must pass Navy specifications.

Forgings were specified, but none could be secured in time.

Quickly available in Ryerson stocks were cold rolled bars—the right size—but in five different analyses.

Navy Inspectors were skeptical. Could Ryerson heat-treat and assure uniform physicals—also furnish pull tests for each bar? Well, no; because the piece left after the bars were cut to the needed length, would be too short to make a standard 6″ test sample. A delay of five weeks loomed ahead. . . .

Then Ryerson metallurgists found a way: Inquiry revealed that the shafts were to be machined down at each end for a distance of 7″. So, why not cut a piece from the side of each bar, *before machining*—enough for all tests yet leaving sufficient stock for machining to size? The idea worked perfectly.

The data charts always furnished with Ryerson Certified Steels provided the exact analysis of each bar and assured proper heat-treatment. A few minutes hacksaw work yielded the necessary test samples . . . and all fourteen bars passed the rigid Navy Inspection with flying colors.

Ryerson ingenuity has helped many manufacturers in solving production problems—has also cut ultimate delivery time from months to days. Ryerson engineers and metallurgists, backed by a century of service to the nation, are ready to work with you in accordance with WPB plan in making the most of all available steel.

Cutting 6″ test pieces from side of bar without affecting length.

JOSEPH T. RYERSON & SON, INC., Chicago · Milwaukee · St. Louis
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RYERSON STEEL-SERVICE

THE IRON AGE

JULY 30, 1942

ESTABLISHED 1855

Devil Take the Little Fellow

ONE of the outstanding characteristics of American enterprise has been the urge to invent and patent. Under the protection of our patent laws, little people with big ideas of merit have been placed in position to compete successfully with large and powerful enterprises, or if not to compete with them, at least to deal with them on a remunerative basis.

Many of our successful concerns of today owe their start to the protection afforded them by our patent system. Under that protection, they have been able to develop and market worthwhile new products in competition with strongly entrenched and powerfully financed interests. Without this protection, they would have been sunk from the start.

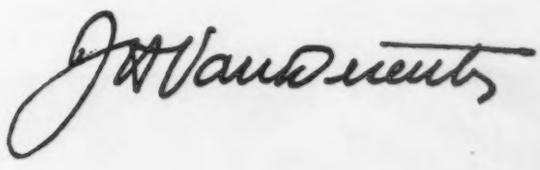
It is now proposed, in Senate Bills 4191 and 2303, to establish the principle of automatic licensing of all inventions, whereby any corporation, or government, even in peace times, is enabled to manufacture and sell the patented device upon the agreement to pay established license fees.

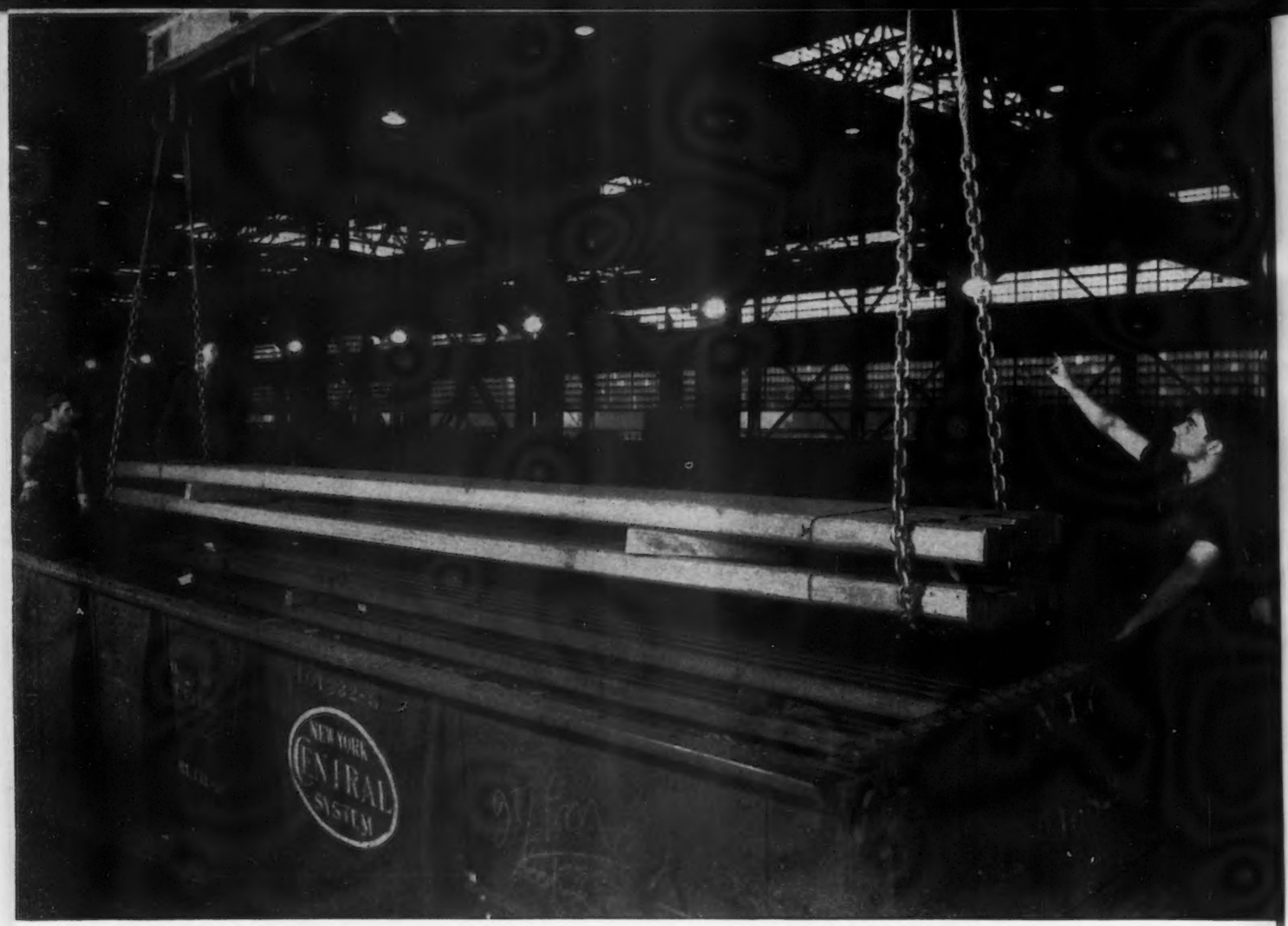
You, for example, invent an improved carburetor for an automobile. It beats anything now on the market. Your friends are willing to put up the money to finance its manufacture and sale, giving you control of the business. How much chance do you think that you would have to stay in the carburetor business with Ford, General Motors, Chrysler or the government taking licenses under the terms of these bills?

It is true that you would make money on royalties. But I do not think that the farsighted founders of our patent system were thinking just of that. I think they were thinking of establishing a way in which little businesses could be protected during their formative periods, so that these little businesses could have a chance to grow larger and thus strengthen our industrial economic fabric.

Under the proposed revision of our patent laws, research and development of ideas would be seriously handicapped. One competitor, for example, could wait for another to spend thousands of dollars and months of time in perfecting an idea to the point of marketability and then demand a license to manufacture and compete. Under such circumstances, big money concerns would have all the advantages over their smaller competitors.

The present trend of events, in general, is not doing much to encourage the small business or manufacturing enterprise. On the contrary, it is doing a great deal to smother them. And this newest of newdealistic tinkering with our patent system is like throwing the seed corn down the sewer and trusting to luck, or to Washington, that the present crop of industries will be sufficient without replanting.





INLAND PACKAGING AND SHIPPING
Steps Up War Output

Properly packaged and shipped steel steps up war output by avoiding damage and loss of vital tonnage during transit—by making better use of railroad equipment—and, by speeding unloading, storage and distribution at war production plants.

For many years Inland has been studying and applying better methods for packaging and shipping steel. It has been Inland's job to send the right steel, and have it arrive at destination in perfect condition, for economical unloading and immediate use in production.

That is why Inland specialists study each customer's packaging and shipping requirements. They ascertain: delivery service required, rail or truck; methods of unloading; character and capacities of unloading and handling equipment; type of cars or trucks required; size of lifts or packages; storage methods; and, protection needed for material in transit.

Inland experience in packaging and shipping is saving vital steel—helping the railroads use cars to the best advantage—and, aiding war plants meet production schedules.

An Inland expert will gladly help you speed war output by studying your incoming steel packaging, shipping and unloading problems.

A few typical results of Inland Steel packaging and shipping:

A. Change of type of car reduced unloading costs 75%.

B. Improved handling method raised car unloading from 6 to 16 cars in 8 hr.

C. Inland packaging saved 40% of storage space.

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Machining Forged A. P. Shot

By J. B. NEALEY

. . . Greater strength at the hardened point and a saving of about 30 per cent in material are gained by centerless grinding forged bar stock, as compared with turning the shot from bar stock.

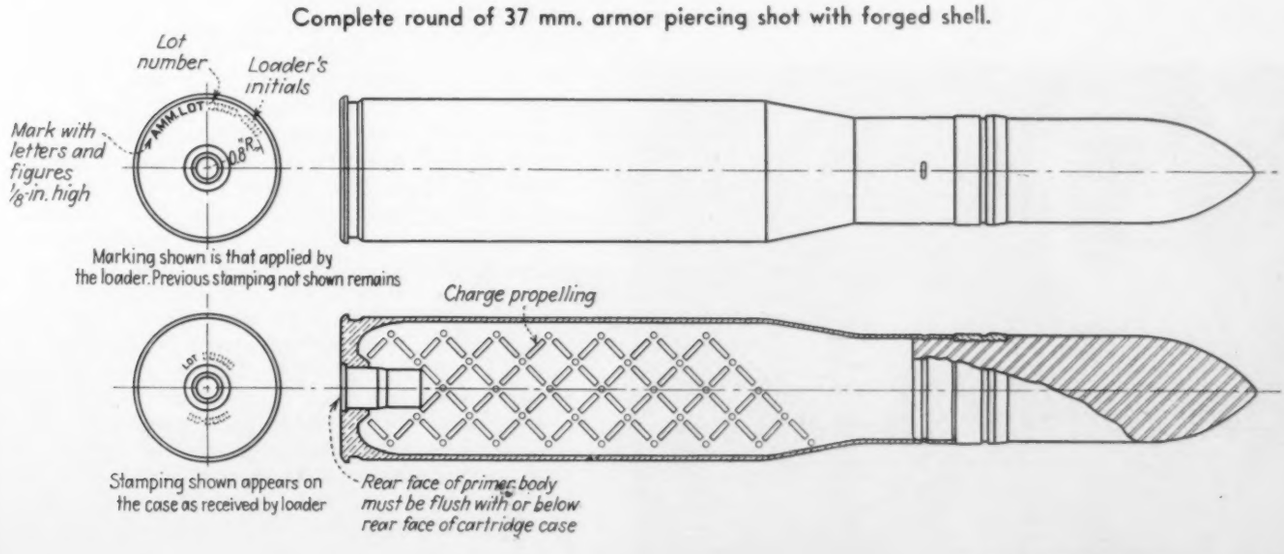
MODERN armor plate was developed to protect the battleship and was later applied to the tank and vital parts of the airplane. Two groups of officers of the Ordnance Department of the U. S. Army have been constantly at work ever since World War I in a race, the one developing tougher armor plate and the other in creating better armor piercing shot. For, if the country has armor plate that will resist the enemy's artillery and shot that will pierce the enemy's protection the road to victory will be much shorter.

At first, the introduction of armor plate of alloy steel, face hardened and with a tough core, obsoleted the then standard armor piercing projectile. A whole new series of A.P. shot have been developed since. As ballistic properties are improved by a sharp nose and penetration is more effective with a blunter design, a windshield is added to some types to produce the streamlined ogive. Also a cap is added between the nose and windshield. On impact the windshield and then the cap are broken, but the hard face of the cap has delivered a shattering blow to the armor plate and weakened it before the hard nose of the shot itself exerts its blow. Therefore, the shot reaches the greatly strained plate in an undamaged condition. Tank warfare is conducted at comparatively short ranges so the armor piercing shot employed in this phase of warfare requires neither the cap nor the windshield.

While many A.P. shot are turned from bar stock in lathes, single purpose machines and automatic screw machines, a forging technique has been developed that produces a superior projectile with an appreciable saving in material. It is recognized that the poorest structure in bar stock is the center. The most important part of an A.P. shot is the nose or point and when machined from bar stock this might constitute a weakness.

A recently developed forging technique reworks the raw steel so as not only to eliminate such voids that may exist but also to arrange the grain flow to converge at the nose in a hard, tough knot with superior shattering or penetrating qualities. Proof of its excellence is

Complete round of 37 mm. armor piercing shot with forged shell.


Lot number
Loader's initials
Mark with letters and figures 1/8-in. high
AMM LOT
0.8 R
Marking shown is that applied by the loader. Previous stamping not shown remains
Charge propelling
LOT
Stamping shown appears on the case as received by loader
Rear face of primer body must be flush with or below rear face of cartridge case

SHEARING hot rolled bar steel to length.

FORGING billets to rough form nose of shot.

REMOVING forging nib with abrasive cut-off wheel.

found in the fact that all shot so far produced and submitted for ballistic tests have been approved. Furthermore, forging and shearing as against machining from bar stock and sawing, produce a saving in material of approximately 30 per cent.

This process was developed by engineers of an Ohio plant working with officers of the Ordnance Department of the U. S. Army who have already produced a million in the past four months and are working on their second million.

This shot is a certain type of 37 mm. weighing 1.91 lb. Raw material is hot rolled bars 1 7/16 in. round. This is smaller in diameter than the shot itself, the full diameter being attained during forging.

As time was short, this company went into production with a minimum of new machines and adopted a sequence of operations that would permit the use of equipment available. The first operation is to shear the 14 to 16-ft. bars into forging pieces in a Consolidated press. These pieces, carefully sorted as to weight, are annealed at 1700 to 1800 deg. F. in a gas-fired rotary furnace about 9 ft. in diameter. The ring shaped hearth is supported on an umbrella-like steel structure centering in a post. Post and hearth are rotated by motor driven pinion and ring gear. Automatic temperature control with a recording pyrometer are provided. One man feeds the furnace and another removes the hot blanks dropping them alternately into one of two chutes feeding two Consolidated presses fitted with forging dies.

Forging is done with one piece dies having knockout pins and is accomplished in one stroke. The material is forced into the nose and to insure uniformity and prevent the formation of "tear drops," extra material is pushed into a lug or nib extending from the point. This is ground off in a pedestal type, abrasive cut-off machine. Graphite bearing grease is used as a lubricant for the forging dies. Annealing follows in one of four oven-type furnaces about 5 x 10 ft. in dimension. Each is heated with 20 gas burners, 10 to a side. Automatic temperature control is achieved by a motor operated valve in the airline and a temperature chart is kept by a recording pyrometer. The shot are loaded into the furnace in boxes, heat treated and cooled.

On the machine line, the first operation is grinding the O.D. in

Nos. 2 and 3 Cincinnati centerless grinders in four passes, using through feed and allowing 0.005 in. stock for final finish. The band seat is formed in single spindle Cleveland automatics or Oster hand turret lathes. These machines groove and undercut the band seat and face and radius the back end. The Cleveland automatics have a magazine feed attachment which automatically feeds the shot through the spindle and into the collets. A single cutting tool, about 1⅝ in. wide is used and this cuts three diameters, five grooves and one radius. A second tool faces off the back end.

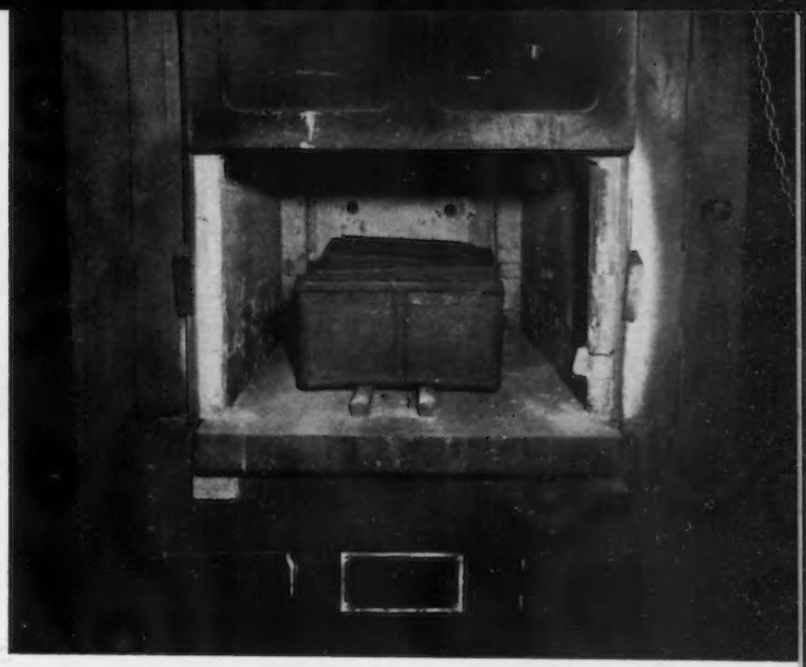
The tracer cavity in some instances is drilled in a single spindle Cleveland automatic and is countersunk in a single spindle drill press. The back end is buffed on a belt sander to remove burrs. The nose is rough and finish formed on Oster turret lathes. Finish grinding the o.d. is accomplished with a single pass on a Cincinnati centerless grinder with a magazine feed.

Knurling of the band seat is accomplished by breaking up the rings left by the Cleveland automatics. A new type of hydraulic machine was developed for this operation. Instead of using a circular knurl which is pressed against the rotating work, this plant has developed a rack type knurl which drives the shot while it is held freely in a fixture. The fixture consists of a block of steel with a central hole into which the work is inserted. When forced down by a vertical hydraulic ram, the rack knurl presses against the band seat, rotates the shot and knurls the seat in one revolution of the shot. The work is withdrawn before the knurl tool is retracted.

All machine operations to this point are then inspected by a group of women inspectors. Each will inspect an average of 500 pieces per hr.

A heat treatment is now in order and for this a battery of Tocco induction machines is provided. In ordinary fuel fired furnaces, steel shot swell in diameter and shrink in length. The opposite is true when they are heated electrically by the induction method. In finishing the 37-mm. A.P. shot, allowances are made for a decrease in diameter and an increase in length. Hence the induction method affords a real economy.

Each Tocco machine consists of two multiple unit holding fixtures, coil sets, quenches, etc., so that a



INTERIOR of annealing furnace, showing heat treating containers loaded with 37-mm. forged billets.

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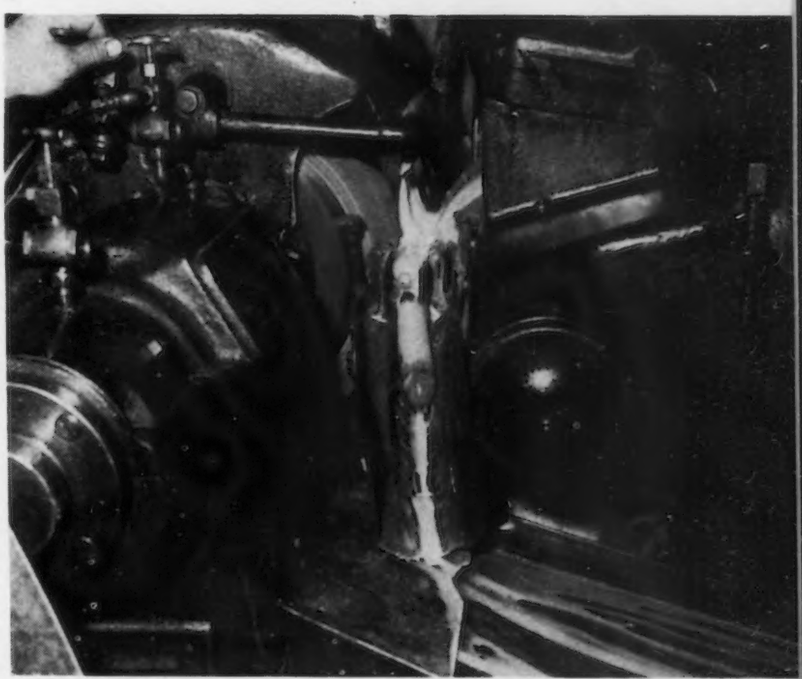

GRINDING O.D. on a Cincinnati No. 2 centerless grinder.

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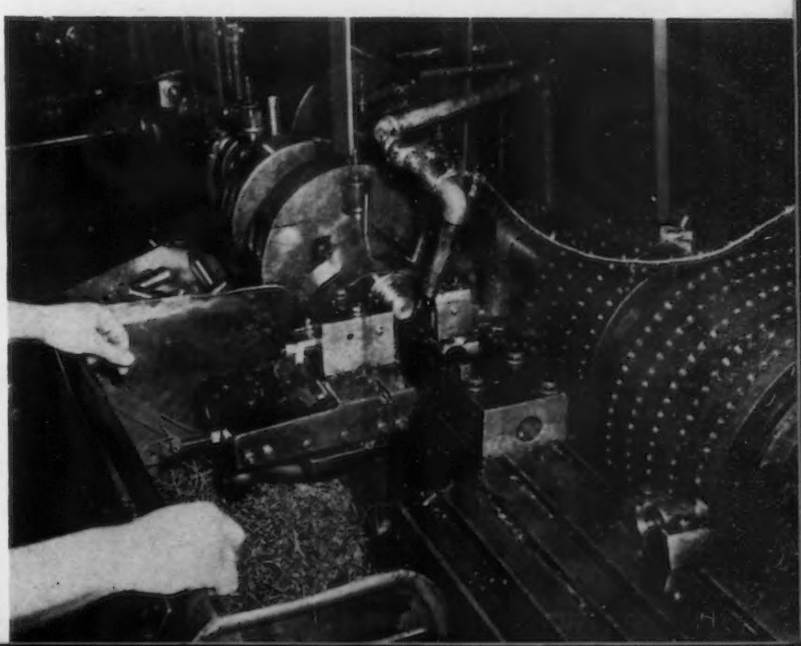
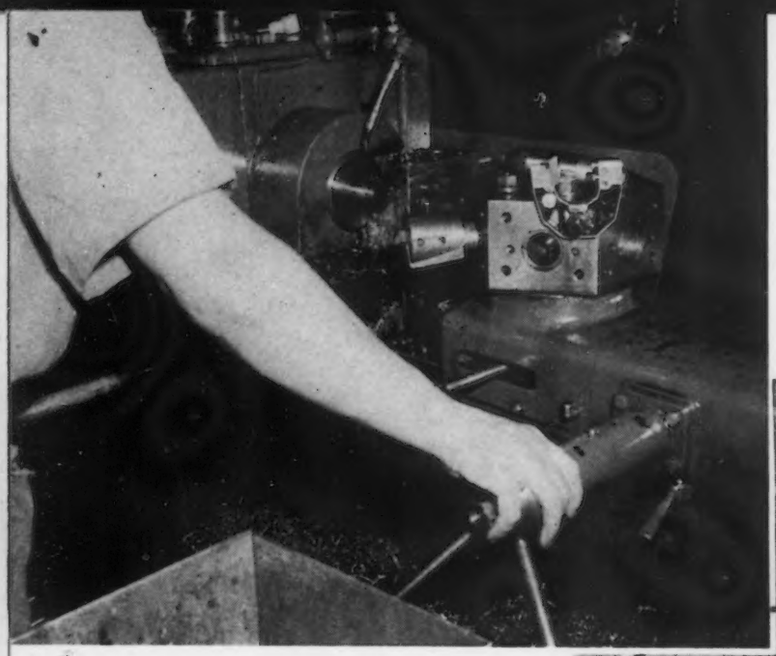


ON this Cleveland single spindle automatic screw machine the rotating band seat and the casing groove are formed and undercut, the base is faced and chamfered with a radius, and the tracer cavity is drilled.



LEFT

AN alternate method of forming the band seat, facing and chamfering the base and drilling the tracer cavity is to use an Oster Rapiduction hand turret lathe as shown. Note the "Go" and "Not Go" snap gage which is bolted to one of the idle turret faces. A similar machine is used for rough and finish forming the nose of the shot, using a form tool on the rear cross slide only.

o o o

BELOW

HEAT treating the shot in Tocco induction hardening units. Each holding fixture, which is power elevated into the coil area, holds six shots.

ABOVE

KNURLING the band seat in a special hydraulic machine using a rack type knurling tool. The work is turned by the straight knurling tool as the ram pushes the latter down.

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o o o

RIGHT

SURFACE finish check of 37 mm. shot is done under magnifying glasses.

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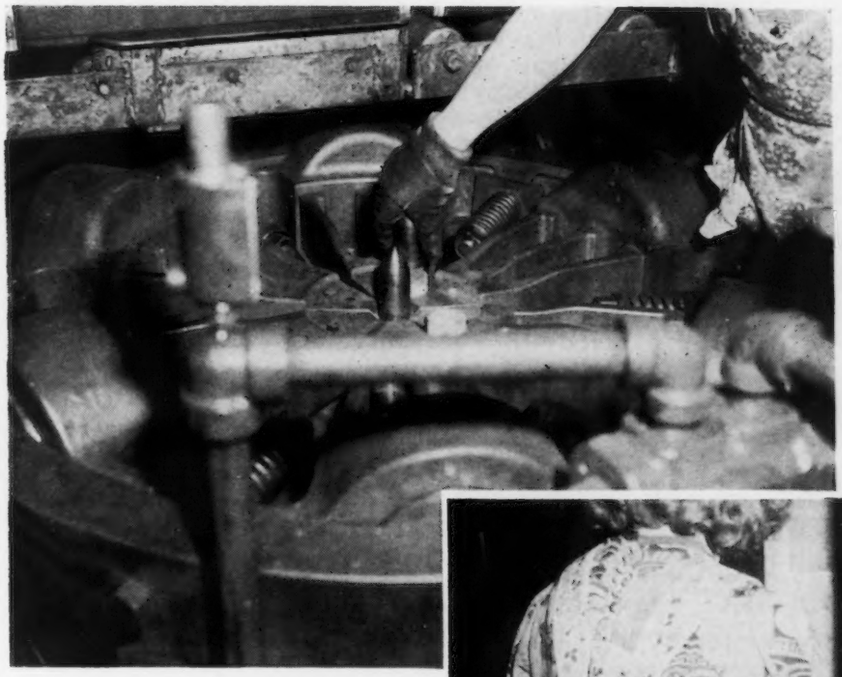

ABOVE

WEST tire-setting press shrinking rotating bands onto shot.

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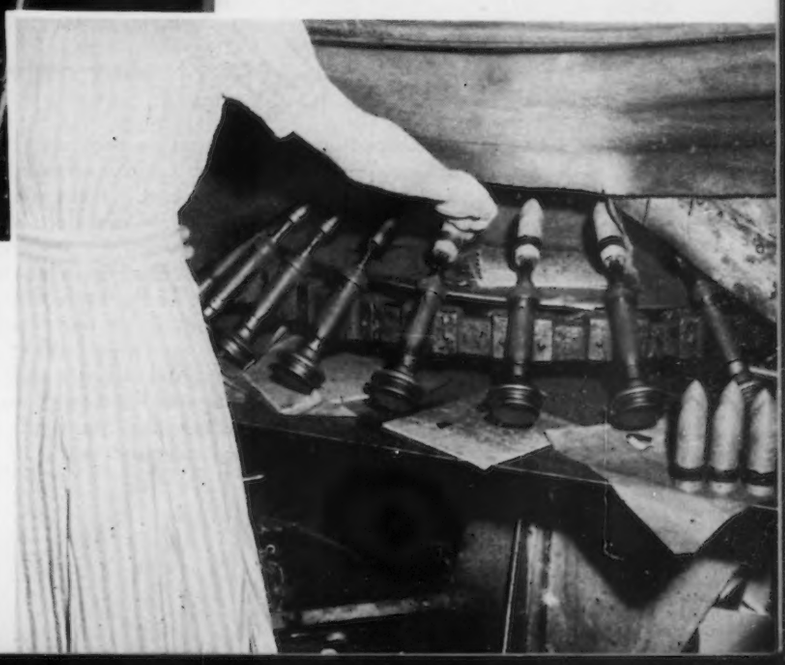
o o o

BELOW

SIX diameters are gaged simultaneously on this Sheffield Multi-chek gage which uses signal lights to show whether the diameters are on size, over size or under size.

BELOW

REMOVING shot from spindles at the rear of the paint spraying machine and placing unpainted shot in position.



ABOVE

LACQUERING of shells by hand. Cardboard masks are first placed over the rotating band preparatory to lacquering. The shot holders are rotated by power while in the spray area.

single operator can load and unload one while the other is in operation. These machines work automatically on a predetermined time cycle of 90 sec.

The operator loads six shot into the first fixture and a motor raises the hole fixture into the coils above. Here they attain temperature, are soaked at this heat and then quenched. Water sprays are used while the shot are still in the coils. The water is collected in a system of tanks where it is cooled and recirculated by pumps.

Drawing is accomplished in a Holcroft electric furnace some 8 ft. wide and 35 ft. long. The work is carried through on a motor driven apron type conveyor about 4½ ft. wide. This furnace is equipped with automatic temperature control of four zones and is provided with both recording and visual pyrometers. At this point the shot lie dormant for a period for a strain relief treatment. Each shot is then cooled in a water bath, is immersed in boiling water and finally cooled in a water bath. The next cycle consists of washing, wire brushing and rinsing to remove rust and scale. Each shot is then carefully examined visually for cracks with the aid of a four power magnifying glass.

The rotating bands are cut from tubes of gilding metal about 1⅝ in. in diameter in Cleveland screw automatics. These are burred in a hydraulic broaching press, washed, annealed and quenched in water. They are then pressed onto the shot in segmented West tire setters with a hydraulic ram of each segment. The shot are then chucked in a Porter-Cable lathe and the final operations are accomplished by four tools on two cross slides. These operations are turn the band diameter, chamfer and groove the band and undercut the body. A hand-operated reamer is then pushed in to clean the tracer cavity. The burr is removed from the band in a drill press and the shot are inspected in a Sheffield Multi-chek which gages six diameters simultaneously, revealing by colored signal lights any diameter that is not correct.

After stamping on the lot number, etc., the shot are cleaned in a Detroit-Rex degreaser and a band shield is installed prior to lacquering the shell body. Lacquering is accomplished by hand or automatically on a circular cast iron ring some 5 ft. in diameter containing 24 fixtures onto which the shot are loaded by hand. The shot are rotated by these fixtures as they are carried around so as to be completely covered by the fixed spray. As they are still hot from the degreaser, this lacquer dries quickly. The ring makes one complete revolution every 2 min.

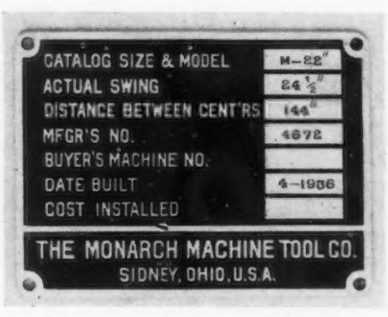
A final visual inspection is given, the protecting shield is removed from the band and the shot are packed in cartons.

Consider again the question of the saving in material by forging instead of machining from bar stock. In the first place, with bar stock approximately ⅛ in. is removed in machining. As against this, an undersize billet is forged to size and the surface cleaned up in a centerless grinder. In the second place, all metal hogged off the nose of bar stock is lost while the only loss in forging is the tip. Thirdly, from ¼ to 9/32 in. is lost from the back face when bar stock is cut off while no loss results when forging stock is sheared. It is estimated that at least 30 per cent in material is saved in forging, in addition to producing a better projectile.

Operations on 37-Mm. A. P. Shot

	OPERATION	EQUIPMENT
1.	Shear hot rolled bar stock to length	Consolidated press
2.	Anneal at 1700-1800 deg. F.	Rotary, gas-fired furnace
3.	Forge shot	Consolidated forging press
4.	Cut off lug at nose	Abrasive cut-off machine
5.	Anneal	Box type, gas-fired furnace
6.	Rough grind o. d. of shot	Cincinnati No. 2 or No. 3 centerless grinder
7.	Groove and undercut band seat, face base and chamfer radius, drill tracer cavity	Cleveland single spindle automatic
8.	Countersink tracer hole	Drill press
9.	Buff base of shot	Belt sander
10.	Rough and finish form nose	Oster Rapiduction lathe
11.	Finish grind o. d.	Cincinnati centerless
12.	Knurl band seat	Special machine
13.	Inspect	Bench
14.	Induction harden	Tocco unit
15.	Draw	Holcroft electric furnace
16.	Wash, wire brush and rinse	
17.	Inspect visually	Four-power magnifiers
18.	Press on rotating bands	West tire setter
19.	Turn band diameter, chamfer and groove band; undercut body; ream cavity	Porter-Cable lathe
20.	Burr band	Drill press
21.	Inspect six diameters	Sheffield Multi-chek gage
22.	Stamp lot number	
23.	Degrease	Detroit-Rex degreaser
24.	Place cardboard shield over band	Bench
25.	Lacquer body	Rotating machine
26.	Visual inspection	Bench
27.	Remove shield	Bench
28.	Pack shot in cartons	

NAMEPLATE placed upon each machine produced by Monarch Machine Tool Co., Sidney, Ohio, and used in the company's plant. Monarch executives credit these plates with increasing employee sense of responsibility and care in usage, when the value of the machine upon which they are working is set before them. Moreover, this standardization in locating the serial number of each machine eliminates the usual difficulty in securing this information on machines in various production lines. At the same time, it simplifies inventory taking, the ordering of repair or replacement parts, and offers to shop superintendents a constant visual knowledge of the age of each machine in his shop. In an actual installation, the blank spaces have the proper data stamped in.



Cast Iron Borings for Steel Surface Protection

. . . Steel may be packed in cast iron borings and be heated for quenching without scaling or appreciable decarburization if conditions are favorable. The results herein of a series of experiments on this practice show it to have considerable merit.

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and
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THE use of cast iron borings or turnings for protecting steel has been a practice for many years. This use has not been general, but has more or less been relegated to the plant where it had become established as an occasional practice, and where borings and turnings were available as a by-product. Before the advent of controlled atmospheres, the surface protection of a finished part could only be obtained by packing, as for carburizing, and many thought that cast iron borings obtained a more neutral protective atmosphere. Bullens* refers to the latter practice as offering fair protection from decarburization, and Palmer† mentions that by it the decarburization of the surfaces of tools during heat treatment can be prevented.

*"*Steel and Its Heat Treatment" D. K. Bullens, 4th Edition, Vol. I., p. 332.*
†"Tool Steel Simplified," F. R. Palmer, 1st Edition, p. 119.*

With men and machines working night and day in the general expansion of production of machines and implements of warfare and with heat treating capacity being pressed to its limit and controlled atmospheres used only on the most important jobs, any item of manufacture that can contribute to the prosecution of the program as a whole is most welcome. The machine tool industry is producing more cast iron borings than ever before. The natural handling of borings as scrap for remelting has always been a ticklish problem, because they offset the most careful calculations when added to the furnace charge. The use of borings as a protective atmosphere does not destroy them, and it is the authors' contention that they will still be available as raw material as part of the charge going into the iron blast furnace.

A series of experiments have been made and from these a semi-qualitative estimate of the protection available to steels in the range from Armco iron to a 1 per cent carbon steel has been drawn. Soda ash has also been admixed with the cast iron borings to learn the possible energizing effect and the consequent alteration of results. The work was conducted on five steels at four different temperatures, each test being held at temperature for a period of 6 hr. This 6-hr. period was selected arbitrarily as being sufficient time to learn the trend of the action.

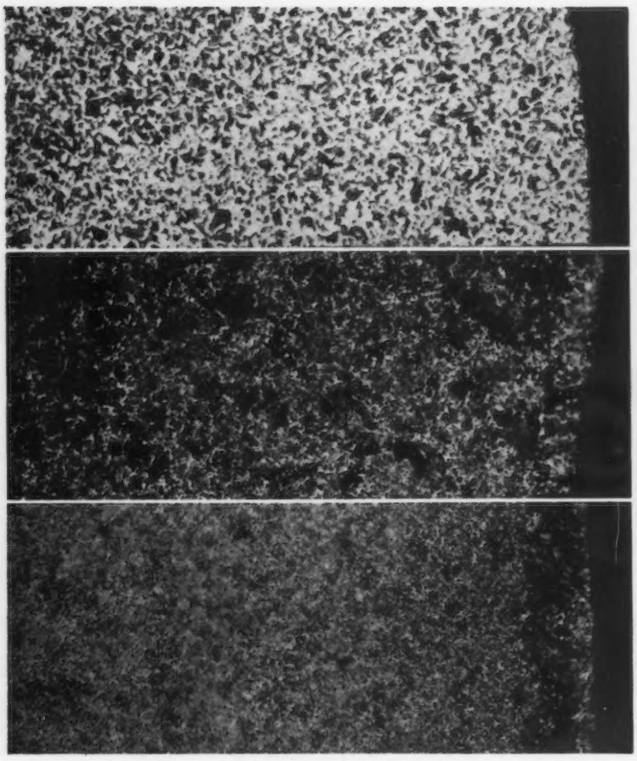
The steels analyzed as follows:

C, Per cent	Mn, Per cent	S, Per cent	Ph, Per cent
0.01	0.017	0.025	0.005
0.17	0.76	0.036	0.018
0.40	0.70	0.040	0.020
0.65	0.85	0.030	0.020
1.04	0.30	0.040	0.020

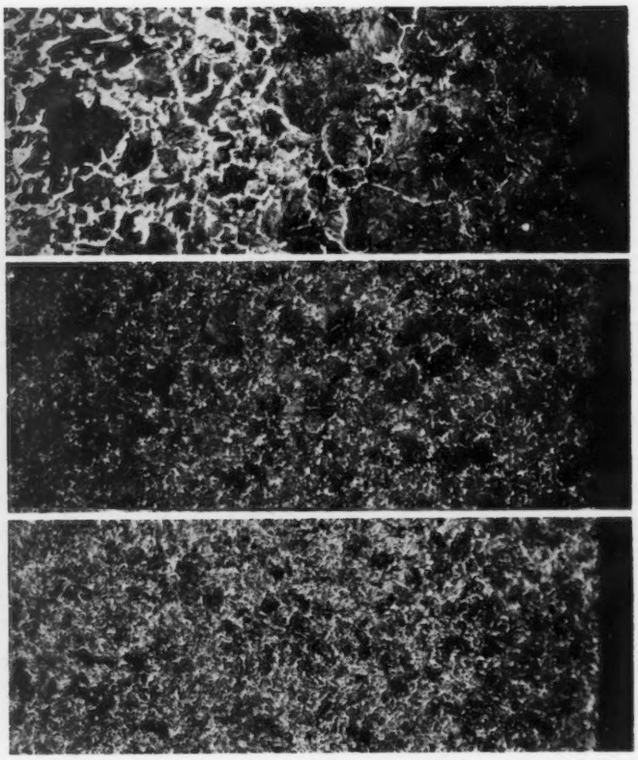
A small sample, about ½ in. in diameter and ¾ in. long was used in each test. The only preliminary preparation was grinding to remove scale and in order to insure that the surface would be clean.

The cast iron borings were obtained from gray iron machine castings that had been machined dry. They did not contain oil and were exceedingly clean. The soda ash was an anhydrous, powdered reagent. It was mixed mechanically with the cast iron borings. The basis of addition was pounds per 100 lb. of borings. The container was a new tin can, pint size, having the specimen symmetrically placed in the center and the cover sealed with fire clay. No attempt was made to use the specimen, container, or packing medium more than once.

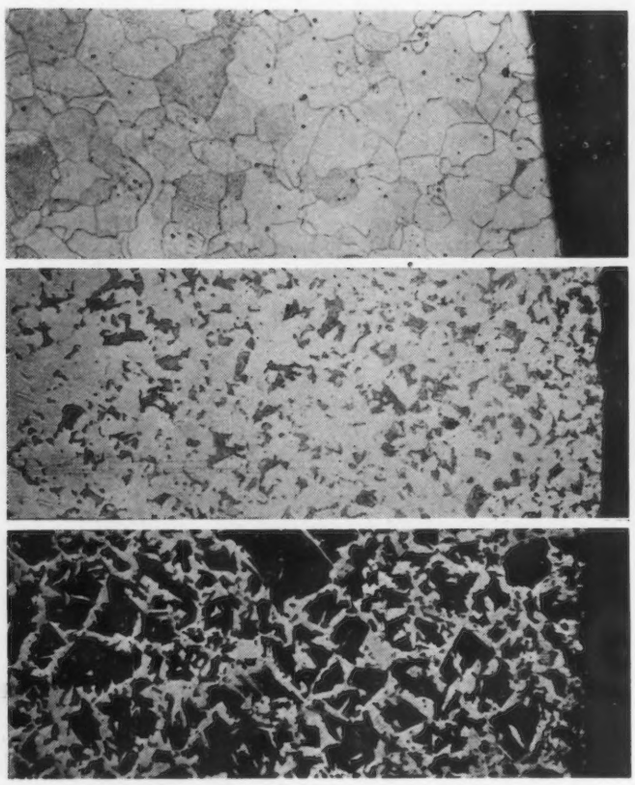
Thirty cans were heated at one time in a large furnace. The procedure was to heat to temperature, hold at temperature for 6 hr., cool to room temperature, and remove the specimens. Specimens were cut in half and mounted to preserve their edge. The section was polished and etched, and examined at 500 diameters magnification. Maximum surface carbon was estimated by comparison with stand-

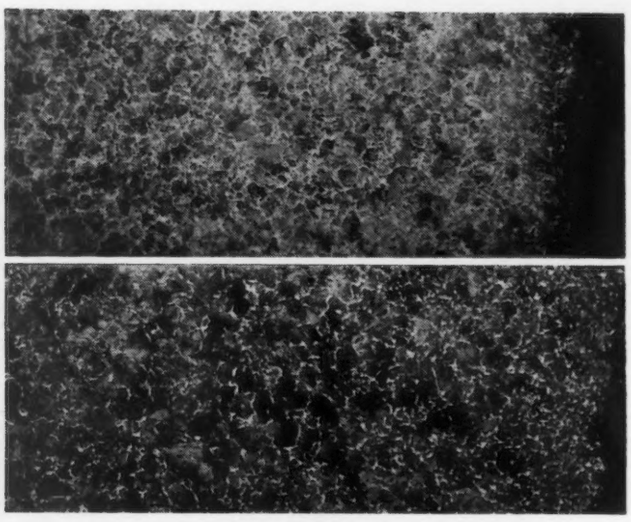


FIGS. 1 to 3 (Top to bottom)—Heated for 6 hr. at 1450 deg. F. in plain borings. Fig. 1 (top) 0.40 per cent carbon steel, Fig. 2 (center) 0.65 per cent carbon steel, Fig. 3 (bottom) 1.04 per cent carbon steel.



FIGS. 4 to 6 (Top to bottom)—Heated for 6 hr. at 1450 deg. F. in a mixture of 3.5 lb. of soda ash per 100 lb. of borings. Fig. 4 (top) 0.40 per cent carbon steel, Fig. 5 (center) 0.65 per cent carbon steel, Fig. 6 (bottom) 1.04 per cent carbon steel.



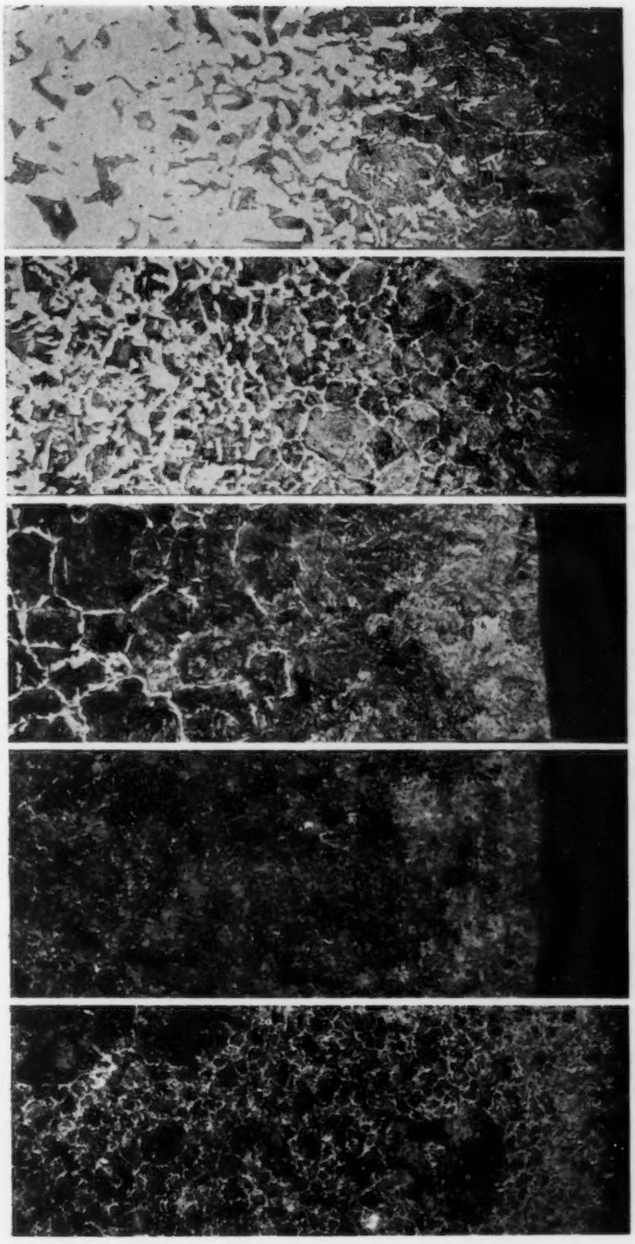


ABOVE

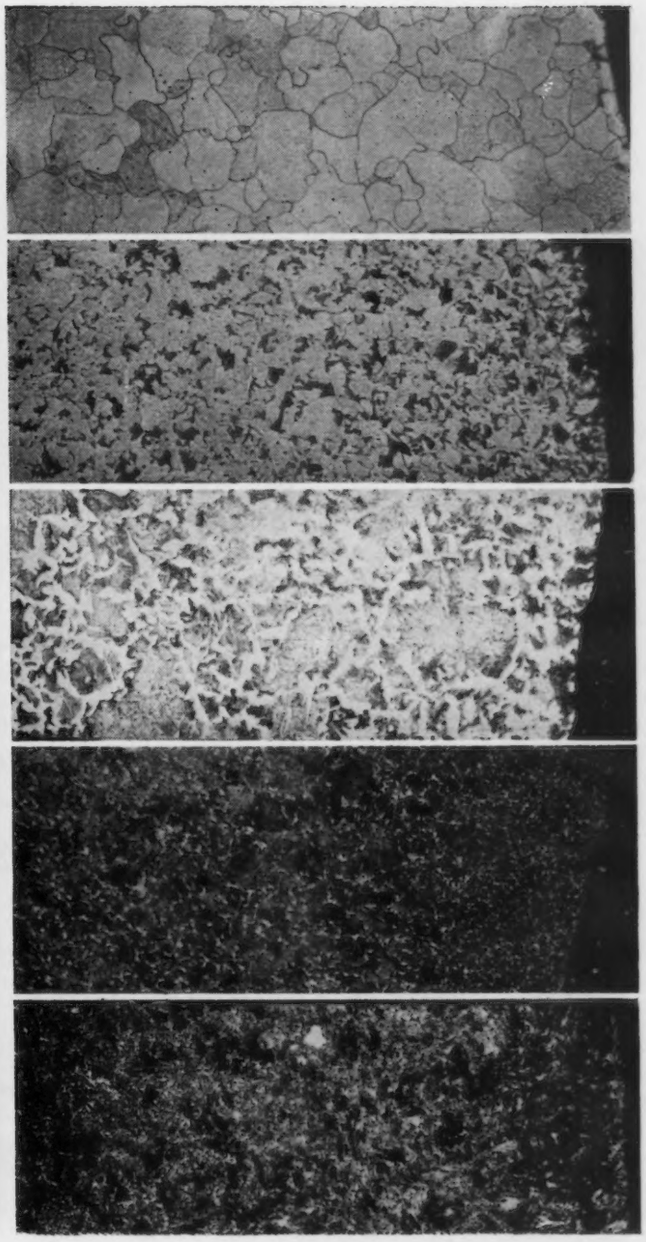
FIGS. 10 and 11—Heated for 6 hr. at 1550 deg. F in plain borings. Fig. 10 (top) 0.65 per cent carbon steel, Fig. 11 (bottom) 1.04 per cent carbon steel.

LEFT

FIGS. 7 to 9 (Top to bottom)—Heated for 6 hr. at 1550 deg. F. in plain borings. Fig. 7 (top) Armco Iron, Fig. 8 (center) 0.17 per cent carbon steel, Fig. 9 (bottom) 0.40 per cent carbon steel.



FIGS. 12 to 16 (Top to bottom)—Heated for 6 hr. at 1550 deg. F. in a mixture of 3.5 lb. of soda ash per 100 lb. of borings. Fig. 12 (top) Armco Iron, Fig. 13 (upper center) 0.17 per cent carbon steel, Fig. 14 (center) 0.40 per cent carbon steel, Fig. 15 (lower center) 0.65 per cent carbon steel. Fig. 16, 1.04 per cent carbon steel.



FIGS. 17 to 21 (Top to bottom)—Heated for 6 hr. at 1650 deg. F. in plain borings. Fig. 17 (top) Armco Iron, Fig. 18 (upper center) 0.17 per cent carbon steel, Fig. 19 (center) 0.40 per cent carbon steel, Fig. 20 (lower center) 0.65 per cent carbon steel, Fig. 21 (bottom) 1.04 per cent carbon steel.

ard samples. The depth of the affected zone was measured with a Filar micrometer.

The results obtained after heating 6 hr. at 1450 deg. F. show that the borings alone offer good protection. The data are given in Table I.

There was a slight decarburization of the 1.04 per cent carbon steel, but the 0.65 and 0.40 per cent carbon steels were unaltered. When soda ash was added to the mixture, however, the latter were carbur-

TABLE I

Estimated Change in Carbon Content on the Surface of the Steels at 1450 Deg. F.

Lb. of Soda Ash Per 100 Lb. of Borings	Original Carbon Content of Steel		
	0.40 Per Cent	0.65 Per Cent	1.04 Per Cent
0 (plain borings)	0.40	0.65	1.00
0.175	0.40	0.65	1.00
0.35	0.40	0.65	1.04
0.70	0.40	0.65	1.04
1.75	0.55	0.65	1.04
3.50	0.80	0.75	1.04

TABLE II
Estimated Change in Carbon Content on the Surface of the Steels at 1550 Deg. F.

Lb. of Soda Ash Per 100 Lb. of Borings	Original Carbon Content of Steel				
	0.01 Per Cent	0.17 Per Cent	0.40 Per Cent	0.65 Per Cent	1.04 Per Cent
0 (plain borings)	0.01	0.28	0.40	0.55	0.80
0.175	0.06	0.35	0.40	0.55	0.80
0.35	0.12	0.40	0.40	0.65	1.04
0.70	0.15	0.50	0.50	0.65	1.04
1.75	0.30	0.60	0.58	0.72	1.04
3.50	0.70	0.80	0.80	0.80	1.04

TABLE III
Estimated Change in Carbon Content on the Surface of the Steels at 1650 Deg. F.

Lb. of Soda Ash Per 100 Lb. of Borings	Original Carbon Content of Steel				
	0.01 Per Cent	0.17 Per Cent	0.40 Per Cent	0.65 Per Cent	1.04 Per Cent
0 (plain borings)	0.01	0.25	0.40	0.55	0.80
0.175	....	....	0.40	....	....
0.35	....	....	0.40	0.60	0.95
0.70	0.15	....	....	....	....
1.75	....	0.55	0.50	0.65	1.04
3.50	0.70	0.80	0.80	0.80	1.04

TABLE V
Depth of Case in Inches at 1550 Deg. F.

Lb. of Soda Ash Per 100 Lb. of Borings	Original Carbon Content of Steel				
	0.01 Per Cent	0.17 Per Cent	0.40 Per Cent	0.65 Per Cent	1.04 Per Cent
0 (plain borings)	0.0	0.004	0.00	0.002	0.002
0.175	0.002	0.016	0.00	0.002	0.002
0.35	0.017	0.024	0.00	0.00	0.00
0.70	0.020	0.028	0.00	0.00	0.00
1.75	0.024	0.034	0.027	0.009	0.00
3.50	0.035	0.038	0.032	0.027	0.00

TABLE VI
Depth of Case in Inches at 1650 Deg. F.

Lb. of Soda Ash Per 100 Lb. of Borings	Original Carbon Content of Steel				
	0.01 Per Cent	0.17 Per Cent	0.40 Per Cent	0.65 Per Cent	1.04 Per Cent
0 (plain borings)	0.00	0.004	0.00	0.005	0.008
0.175	....	....	....	....	....
0.35	....	....	....	....	....
0.70	0.028	....	0.00	0.001	0.003
1.75	....	0.036	0.030	0.00	0.00
3.50	0.038	0.040	0.037	0.020	0.00

TABLE IV
Estimated Change in Carbon Content on the Surface of the Steels at 1750 Deg. F.

Lb. of Soda Ash Per 100 Lb. of Borings	Original Carbon Content of Steel	
	0.01 Per Cent	0.17 Per Cent
0 (plain borings)	0.04	0.17
0.175	0.10	0.25
0.35	0.15	0.30
0.70	0.20	0.40
1.75	0.25	0.50
3.50	0.40	0.75

TABLE VII
Depth of Cast in Inches at 1750 Deg. F.

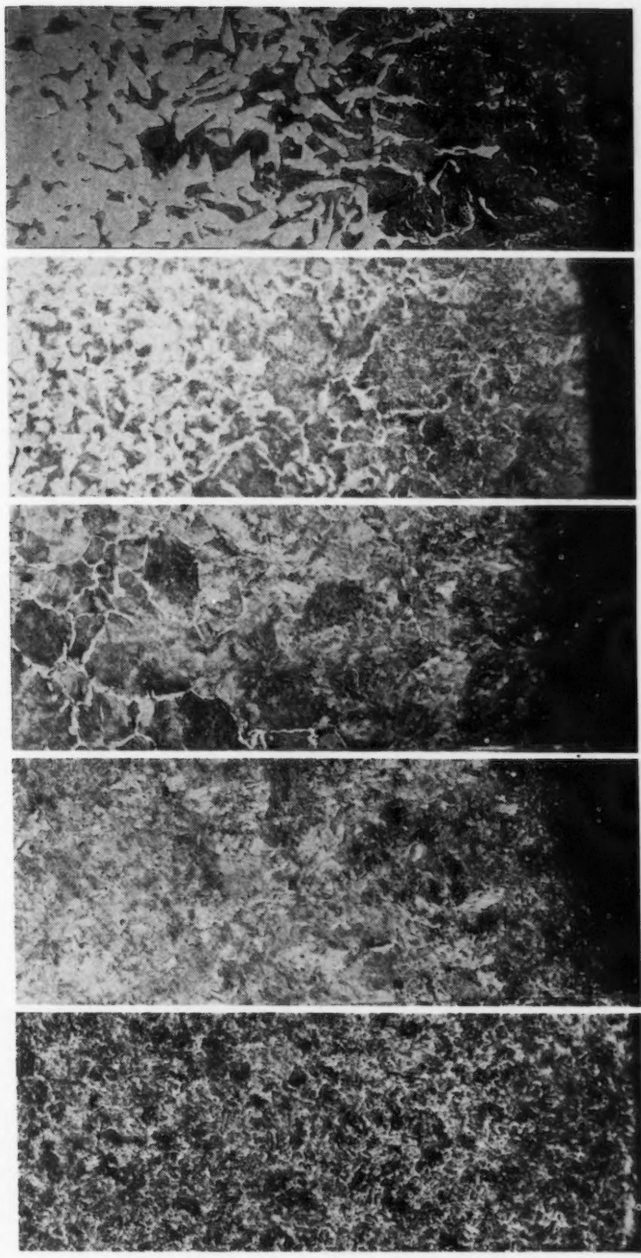
Lb. of Soda Ash Per 100 Lb. of Borings	Original Carbon Content of Steel	
	0.01 Per Cent	0.17 Per Cent
0 (plain borings)	0.00	0.00
0.175	0.015	0.024
0.35	0.018	0.027
0.70	0.027	0.030
1.75	0.034	0.037
3.50	0.041	0.045

ized to about 0.80 per cent carbon while the 1.04 carbon samples remained unaltered. Photomicrographs, Figs. 1 to 6, show some of the results obtained.

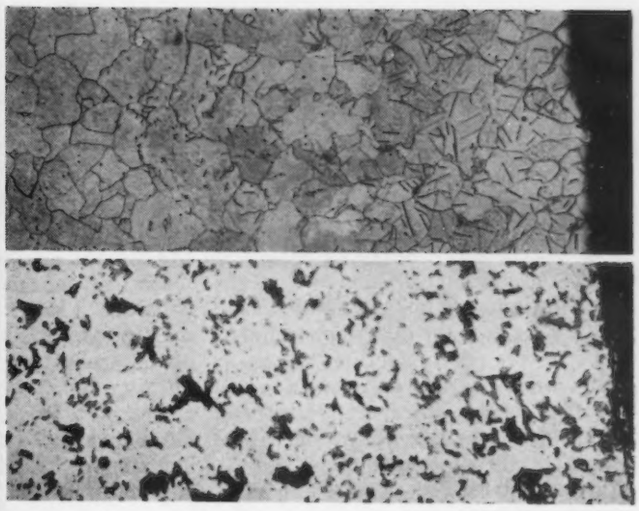
At 1550 deg. F., the activity of the plain borings and the steel surfaces was increased. The low carbon iron was curiously not affected by the plain borings, while 0.17 per cent carbon steel was carburized. The 0.40 carbon steel seemed to be in equilibrium at this temperature, no change having been effected. The higher carbon steels were decarburized. Table II shows the results obtained.

The addition of soda ash energizes the reaction and causes carburization in the lower carbon steels. The higher carbon steels are more generally carburized especially in the upper range of soda ash concentrations. Photomicrographs, Figs. 7 to 16, show some of the results obtained.

Complete data were not collected for all the soda ash concentrations at 1650 deg. F. There was enough, however, to show the trend. It is interesting to note that the re-



FIGS. 22 to 26 (Top to bottom)—Heated for 6 hr. at 1650 deg. F. in a mixture of 3.5 lb. of soda ash per 100 lb. of borings. Fig. 22 (top) Armco Iron, Fig. 23 (upper center) 0.17 per cent carbon steel, Fig. 24 (center) 0.40 per cent carbon steel, Fig. 25 (lower center) 0.65 per cent carbon steel, Fig. 26 (bottom) 1.04 per cent carbon steel.



FIGS. 27 and 28 (Top to bottom)—Heated for 6 hr. at 1750 deg. F. in plain borings. Fig. 27 (top) Armco Iron, Fig. 28 (bottom) 0.17 per cent carbon steel

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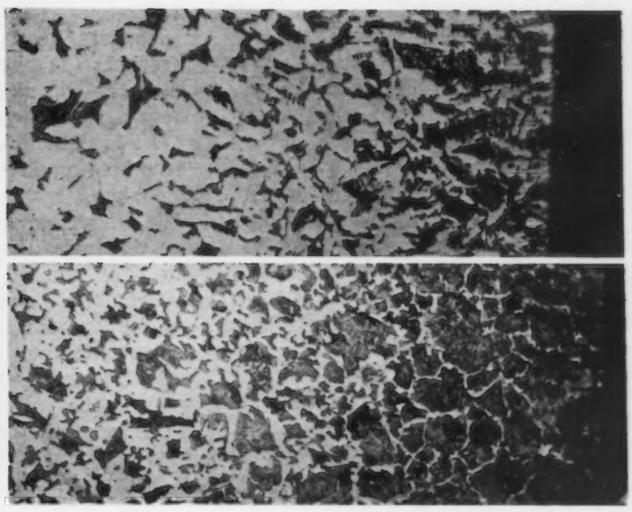


FIGS. 29 and 30 (Top to bottom)—Heated for 6 hr. at 1750 deg. F. in a mixture of 3.5 lb. of soda ash per 100 lb. of borings. Fig. 29 (top) Armco Iron, Fig. 30 (bottom) 0.17 per cent carbon steel.

o o o

sults obtained at 1550 deg. F. are practically duplicated at 1650 deg. F. It might be concluded from this that the reaction rate of carburization or the time period or both serve to nullify the added activity of increased temperature. The results are shown in Table III. Photomicrographs, Figs. 17 to 26, show some of the results obtained.

Only two specimens were tried at 1750 deg. F. Armco iron gave a value lower than the value obtained at lower temperatures. The 0.17 per cent carbon steel also showed a slightly decreased activity in the same direction. The results are given in Table IV. Photomicrographs, Figs. 27 to 30, show some of the results obtained.

The depth of case values obtained at 1550, 1650, and 1750 deg. F., respectively, as shown in Tables V, VI, and VII.

Holders For Light

A RECENT issue of *Technische Rundschau*, Berne, Switzerland, described some of the latest designs of holders or dollies for holding light-alloy or other metal sheets while riveting, the account being based, apparently, on current patent literature. In the holder shown in Fig. 1, two operating parts, the die (1) and the body (2), are arranged to act under spring pressure and are set in a holding case (3).

A further design by Heinkel shown in Fig. 2, has the actual die rigidly connected with the shell, a small spring linking the holder and the body of the holder, both of which surround the shank of the die. In this way movements of the dolly are limited to a great extent, reducing the risk of slipping. The force of impact from the riveting hammer is arranged for by the larger mass performing a greater movement.

In the bottom of the cylindrical shell (1) is fixed a diaphragm (2) by means of a cap cut, while inside the shell is arranged a concentric die (4), the offset end of which (5) carries the die cavity. The die shank is located in guides in the cover (6), that portion numbered (7) having a greater diameter.

The shank of the die inside the housing carries a sliding mass (8) considerably greater in weight than the die and the housing itself. This mass is, on one side, held by a shoulder (10) on the die shank, and, on the other side, by a conical spring abutting against a diaphragm (2).

The housing (1) is held in the hand and force from the riveting hammer causes movement of the die shank because of the system of suspension of this latter on the diaphragm. Acceleration of the die is transmitted to the sliding mass (8), which, by reason of a spring control (9), reacts through a greater distance, causing the die to react against the rivet head.

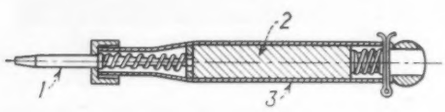
In another design (Fig. 3), based on the same principle, the use of a flexible diaphragm is dispensed with, its place being taken by brackets (11 and 12), which insure that the die shank moves through only a short interval. One bracket (11) is detachable and is mounted on a holding sleeve (14) so that the die shank may easily be replaced. The die shank is located and guided by a ring (15). A spring (16) abuts on one side against a floating weight (14), and on the other side against a further bracket (12), again mounted upon, but detachable from, the sleeve (14). In operation, the sleeve (14) performs no movement, thus the tool is both easy and comfortable to handle.

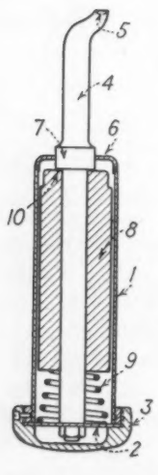
Another Heinkel design provides for the formation of the rivet head not by direct impact from the rivet hammer itself but in consequence of reaction from the holder, the cover of the housing of which forms, in addition, a sinking die to sink the sheet simultaneously with the forming of the rivet head. This tool is said to produce very perfect and uniform headings, as the sinking die into which the sheets are pressed occupies a fixed position.

It is pointed out that excessive hammering is avoided by the use of this device, hence the rivet material is not subjected to a useless and dangerous degree of cold working. The tool and its method of operation are shown in Figs. 4 and 5.

In the housing (1) of the holder slides the die body (2); this is pressed by a spring (4) against the inner surface (5) of the cover (8). On the upper side is fixed the sinking die (6). A projection (3) of the die proper fits into a hole (7) of the cover-plate insuring that a shoulder (5) makes contact with the lower side of the cover. The space above the projection (3) previously referred to serves as the die head.

In Fig. 5 are shown two pieces of sheet metal (9 and 10) placed one over the other, a rivet (12) having previously been drawn through a hole provided. Component (2) of the holder is in its upper position. When the compressed air hammer is brought to bear on the rivet head (12a), the shank forces (2) downwards and compresses the spring (Fig. 5, center). If now the hammer acts further (Fig. 5, right), the rivet (12) is pressed into the metal sheets (9 and 10), which, in turn,





ABOVE

FIG. 1—This design of a holder, with die shank and body under spring pressure, represents an attempt to eliminate danger of slipping.

LEFT

FIG. 2—This Heinkel design of holder has a main spring arranged between the body of the tool and the grip.

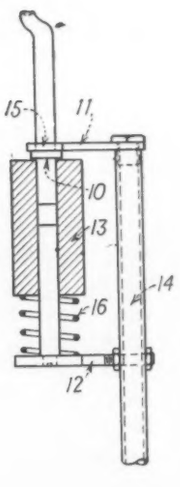


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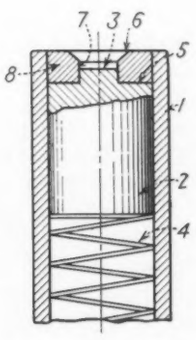
FIG. 3—A modification of the Heinkel design, embodying the same principles as Fig. 2, but designed for different usage.



RIGHT

FIG. 4—This Heinkel designed holder-on performs a heading operation by reaction from the holder itself and not directly from the riveting hammer. See also Fig. 5.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Cases To Be Made Of Steel, Stimson Says

• • • **A changeover from brass** to steel artillery shell cases will be made in the next few months, Secretary of War Stimson said last week. More than 30 manufacturers, among them the American Rolling Mill Co. and Buick Motor Division, are said to be making the new steel cases now. According to Secretary Stimson, ordnance experts consider the new cases as satisfactory as those of brass.

Steel cases have been used by both the Russians and Germans, it is said. The research division of Armco, in cooperation with government and private ordnance organizations, began work on development of a special steel for this purpose early in the war. A manufacturing method which uses the same plant equipment as is used for drawing brass cases has been developed. It is expected that about a million pounds of copper a year will be saved.

Preliminary good results have been obtained in similar experiments just begun with small arms ammunition, Stimson said.

The job of hunting down and directing into war production the estimated 500,000,000 lb. of copper and brass now frozen in idle and excess inventories has been started by the Copper Recovery Corp., which last week compiled its first inventory list of copper available to high priority war producers. The list, which contains more than 2000 different items, was made up from the first 15 days' answers to 100,000 questionnaires sent to holders of copper stocks by CRC.

Under the new plan, inventory lists will be sent frequently to WPB offices and to war producers. Producers who can use items listed will be put in touch with the nearest holders of such stocks, with negotiations left up to the companies concerned.

Items not spoken for 15 days after a list's release will be bought by the CRC at the corporation's salvage prices. Those items which CRC officials feel may still be wanted in their present form will be stored for about 60 days, then, if not sold, scrapped. Other items will be scrapped immediately.

CRC officials hope to have placed all copper stocks in war production work, either as scrap, or as is, within eight months. Originally they estimated that 10 per cent of stocks could be used in their present forms but this estimate, in the light of the first two weeks' questionnaire replies, has been revised to 20 per cent. Another 25 per cent of stocks are said to be in the form of scrap at present. The remaining 65 per cent will probably be scrapped by CRC.

Stocks which their owners refuse to sell, either directly to high priority holders or at a salvage price to the CRC, will be requisitioned. Appeals machinery has been set up, but there can be no appeal on the CRC salvage prices, only on the question of selling or holding. Ernest A. Tupper, chief of the Inventory and Requisitioning Branch of the WPB, estimates that at least 80 per cent of copper stock holders are willing to sell at CRC prices, without any questions.

Any holder of copper or copper-base alloy, who is not engaged in war production and has not received a WPB inventory form, should immediately apply to the nearest WPB field office for copies of Forms 843 A, B and C and file them at once with the Copper Recovery Corp., 200 Madison Avenue, New York.

Higher preference ratings for copper mines in South America, which obtain stipulated amounts of maintenance and operating supplies with the assistance of preference rating order P-58, were announced July 14 by the Director-General for Operations. Operators who have received a serially numbered copy of the order may now apply an A-1-a rating for 25 per cent of the dollar value of the material ordered, A-1-d to 35 per cent and A-3 to the balance. Previous ratings were A-1-d and A-3.

The base period for deliveries is changed to the calendar half year preceding the one in which the rating is applied. An operator may not apply ratings assigned under the order to obtain deliveries of a dollar value exceeding 125 per cent of that for materials shipped to him in the preceding half year. Monthly reports must be filed with the War Production Board showing ratings applied during the preceding month. The order is effective until revoked.

Smelters and refiners of 13 nonferrous metals operating under order P-73 need not file PRP applications for the third quarter of 1942 and will continue to operate under P-73 for that period, the Director-General for Industry Operations announced July 14. P-73 sets up priority ratings for the maintenance and repair needs of 102 smelters and refiners. Many of them are small and do not use the minimum of $5,000 worth of metal in a quarter. Pending completion of a uniform system, P-73 will apply to all smelters and refiners. Metals involved are antimony, cobalt, copper, iridium, lead, mercury, molybdenum, nickel, platinum, tin, tungsten, vanadium and zinc.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead St. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal, New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

•

New Type Plant is Built By Wright Aeronautical

• • • **The Wright Aeronautical Corp.** is constructing, by the "warspeed" process, a new type of concrete building "somewhere in New Jersey," according to an official announcement from the company. The plant is expected to be ready for manufacturing in a short time.

Cyclone aircraft engines in the upper horsepower range will be manufactured in this newest of the New Jersey factories.

Material Shortages Limiting Full Output in War Plants

Cleveland

• • • **Reports from machine tool producers** and war contractors indicate that material shortages have overtaken the expansion and training programs of war plants. Since many war contracts had been signed on the basis of mass production set-ups, it is increasingly apparent that some changes or adjustments in arrangements may have to be made to permit war contractors to cover expenses when operating on a limited production basis.

The Stanley coding system to designate machine tools by certain key letters is expected to be incorporated eventually in the critical tool survey set-up now being made by the War Production Board.

Although the delivery situation has not improved in certain lines such as boring mills, planers and large size lathes, certain other tools are more easily available than they were a few months ago. For example, it is understood that small-size lathe deliveries are now on a four to eight weeks' basis on an A-1-a rating.

The Ohio Injector plant at Wadsworth, Ohio, will build a brick and concrete unit three stories high, 80x84 ft.

Seek Machines for Bullet Cores

Chicago

• • • **An urgent call for subcontractors** capable of turning 0.50 cal. A.P. bullet cores was issued by the local WPB office last week. The agency indicated that facilities in any part of the country would be considered. A prospective subcontractor, WPB said, should have at least two four-spindle automatic screw machines or at least one six-spindle or one eight-spindle automatic, size at least 9/16 in. The 0.50 cal. core is approximately 2 in. long and 3/8 in. in diameter.

The call for 0.50 cal. core contracts is in addition to a recent request for subcontractors for 0.30 cal. cores. Subcontractors for the latter should have at least three No. 00 B & S automatics or three 3/8 in. or larger multiple spindle automatics.

WPB further asked that if any plant had single purpose machines or if attachments had been developed for lathes that might handle 0.30 or 0.50 cal. cores that the plant get in touch with the Chicago WPB office immediately so that arrangements might be made to inspect these machines.

Rudel Takes Over Many of Henry Prentiss & Co. Lines

New York

• • • **The newly formed Rudel Machinery Co., Inc.,** 100 East 42nd Street, New York, has taken over many of the machine tool lines formerly handled by Henry Prentiss & Co. up until the time of the latter's withdrawal from business on June 1. (THE IRON AGE, May 28, p. 92.) The manufacturers now being represented in northern New Jersey, eastern half of New York State and Connecticut by the Rudel concern are the following:

Acme Machine Tool Co., Cincinnati
Avey Drilling Machine Co., Cincinnati
Cincinnati Bickford Machine Tool Co.
Gould & Eberhardt, Irvington, N. J.
Racine Tool & Machine Co., Racine, Wis.
V & O Press Co., Hudson, N. Y.

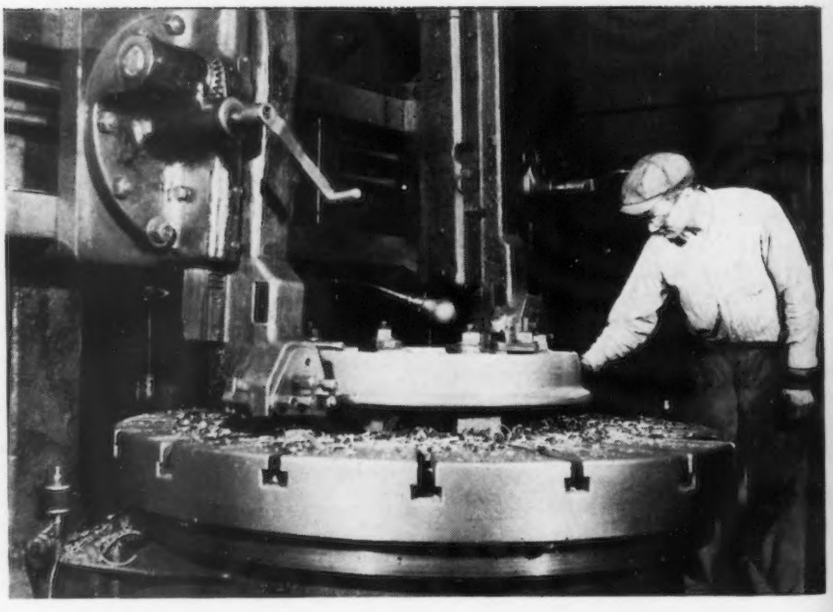
Several other lines are in the process of negotiation.

Rudel Machinery Co. is headed by Thomas R. Rudel, formerly vice-president of Rudel Machinery Co, Ltd., of Montreal, Canada. Mr. Rudel and his family, all American citizens, have been connected with the machine tool business for many years. His father, Clarence M. Rudel, was a salesman for the American Tool Works Co. 45 years ago and the Canadian dealer organization since 1909 and has represented the leading American machine tool builders throughout the Dominion. The senior Rudel at one time was also president of Canadian Vickers, Ltd.

The other members of the new organization were all formerly connected with Henry Prentiss & Co., New York. Walter O. Graham, now vice-president, had been with the Prentiss organization for over 36 years and has served the northern New Jersey territory since 1915. Lewis H. Pratt, another vice-president, had been with the Prentiss firm since 1927, serving the eastern part of New York State. Elbert D. Ackerman, secretary-treasurer, had been in the Prentiss accounting department since 1923. Frank Hamilton, who will handle quotations and orders, had been with the Prentiss organization since 1914, except for an absence during the war.

Other district salesmen are: Robert Granfield (Connecticut) and Richard Taisey (Brooklyn and Long Island).

BUTCHER-MACHINIST: Steve Egels, a butcher until the recent (June 29) reopening of the boring mill of American Locomotive's Chicago Heights plant, is checking a measurement on a carwheel tire for export to one of the United Nations. The entire Chicago Heights plant has been rehabilitated and is turning out steel ingots, tank parts and Navy forgings.



of the Otis works of Jones & Laughlin Steel Corp., at Cleveland. Since 1917, Mr. Lawrence has been engaged in the construction, operation, engineering and metallurgical phases of steel manufacture with several companies. In 1941 he joined the organization of the Otis Steel Co. as assistant to the president.

• **Howard M. Dawson,** formerly of the Detroit office, has been put in charge of the export department, with headquarters in the New York district office, for Jessop Steel Co., Washington, Pa. **Fred Jessop Wood** has taken over Mr. Dawson's former duties at the Detroit branch.

• **William T. Sanford** has been named as service manager of the railroad division of the Buda Co., of Harvey, Ill. Mr. Sanford has served six years with the Hoosick Electric Specialty Co., of Hoosick Falls, N. Y. He has spent two and a half years with the Chrysler Corp., Detroit, as automotive and diesel field engineer; two years with Sinclair Refining Co., Chicago, as field engineer covering the State of Illinois; and three years with Socony-Vacuum Co., Chicago, in the same capacity.

• **Worthing H. Stone** has been appointed assistant advertising manager, in charge of advertising for the railroad, farm implement, automotive and rock bit divisions of the Timken Roller Bearing Co., Canton, Ohio. **S. L. Huffman,** a member of the advertising staff for several years, has been advanced to manager of the news bureau where he will be responsible both for general publicity and technical articles for the industrial press, in addition to continuing his present duties of handling the advertising of the Steel and Tube Division.

• **J. B. Ambler** has been named midwestern district representative of the Pittsburgh Lectrodryer Corp., Pittsburgh. His offices are at 602 Denver National Building, Denver, Colo.

• **Julius A. Berninghaus,** general manager of sales of the organic chemicals division of Monsanto Chemical Co., has been promoted to general manager of the division. He succeeds **John W. Livingston,** who has resigned to become consulting engineer to the Rubber Reserve Company, the federal agency dealing with the provision of facilities for synthetic rubber production.

• **Bruno Loeffler** has been made chief engineer in charge of American Bosch Corp. engineering design, and **W. Chester Robinson** has been named executive assistant to vice-president Edward H. Moll, who is in charge of manufacturing operations.

• **Robert R. Jones** has been appointed personnel director for the Birmingham plant of Rheem Mfg. Co. Mr. Jones formerly was associated with the United States Employment Service in Alabama.

• **John F. Brandt** has been elected president and treasurer of the Anthracite Bridge Co., Scranton, Pa. **William E. Harding** has been named vice-president of the company, and **D. Boulton Musser,** secretary.

• **Joseph A. Elwood** has been appointed general works manager of the George Gorton Machine Co., Racine, Wis. For 19 years, Mr. Elwood had been associated with C. W. Nash of Nash Motors, and was division superintendent in charge of tools and production of the Racine division from its inception. Later he was connected with the Ajax plant of the Walker Mfg. Co. in charge of production. Until recently, he was factory manager of the hydraulic division of the Sundstrand Machine Tool Co., at Rockford, Ill.

• **S. H. Mortensen,** engineer-in-charge of a.c. design for 10 years, has been appointed chief electrical engineer of the Allis-Chalmers Mfg. Co. plants at West Allis, Cincinnati, Boston and Pittsburgh. Starting at the Allis-Chalmers Norwood works in 1905, Mr. Mortensen was transferred to Milwaukee as an electrical draftsman three years later. There he successively became design engineer for d.c. machines, design engineer of rotating synchronous machines, and in 1932 engineer-in-charge of alternating current design.

• **Dan C. Hungerford** has resigned as vice-president and director of the Elastic Stop Nut Corp., Union, N. J. He joined the corporation in 1936 as field engineer and, 18 months later, was made chief engineer. In January, 1940, he was elected to the board of directors and, in July of the same year, was made vice-president in charge of engineering. He was placed in charge of the corporation's sales and advertising activities in 1941.

OBITUARY...

• **F. W. (Bill) Jaeger** died of a heart ailment July 18, aged 71 years. Mr. Jaeger had been the United States representative of the German firm of Schuchardt & Schuette from 1903 until the dissolution of the company, when he became the representative of A. H. Schuette & Co. His connection with that concern ceased at the outbreak of the first World War and after that war, he looked after the American interests of August Schmitz, Dusseldorf. He continued to work for August Schmitz until September, 1939, the start of the present conflict, and since that time has been inactive.

• **Otto Zachow,** fifty years ago originator of the four-wheel drive for automobiles and trucks, died July 15. He was 80 years old.

• **Chester A. Horton,** superintendent of production at the Boston Navy Yard, died, aged 48 years. He had been associated with the Navy Yard for 26 years.

• **Perrin G. March,** president of the Cincinnati Shaper Co., died July 18 of a heart attack, aged 55 years. Mr. March was a son of Perrin March, Sr., founder of the shaper company.

• **S. Houghton Cox,** vice-president and director of the Cleveland Twist Drill Co., died in Pasadena, Cal., on July 12. Up until the time of his death, Mr. Cox served actively as a director, although he was not actively engaged in the conduct of the business, which was founded by his father, the late Jacob D. Cox, II, in 1876.

• **Emmett E. Conneely,** manager of railroad sales of Republic Steel Corp., Cleveland, died July 10, aged 58 years. Mr. Conneely started his business career in Pittsburgh in the purchasing department of Pittsburgh & Lake Erie Railroad and later became assistant to Col. J. M. Schoonmaker. Following this, he was with Standard Steel Car Co. in Baltimore and later became vice-president and director of the New York Air Brake Co. In 1925, he was made New York representative of Pullman Co., which position he held until he became vice-president of the Standard Steel Car Co., in Pittsburgh. He entered the Republic organization in 1933.

PERSONALS

• **Ernest S. Jefferies** has been elected president of the Universal Boring Machine Co., Hudson, Mass. Charles A. Clarke has been named vice-president and chairman of the board. Joseph Wiggin and Alson H. Goodsell have been made vice-president and treasurer respectively.

• **C. W. Meyers** has been appointed special representative in the aviation field with the manufacturer's products division of the sales department of American Steel & Wire Co., Cleveland. In his new post Mr. Meyers will handle the company's affairs with aircraft manufacturers and suppliers and will lend his advisory services as regards stainless steel particularly. Mr. Meyers has been assistant manager of the metallurgical department of American Steel & Wire since 1937. For the past four years he had concentrated on metallurgical problems of special steels, and is an expert on such matters in their application to aircraft construction.

• **R. J. Schuler,** for the past five years assistant manager of sales with the Bolt & Nut Division of Republic Steel Corp., Cleveland, has been named general manager, Hampshire Products, Inc., Milan, Mich. Previous to his Republic connection he was general manager of sales of the LaSalle Steel Co., Chicago, for 10 years.

E. S. JEFFERIES, president, Universal Boring Machine Co., Hudson, Mass.

C. W. MEYERS, special representative, American Steel & Wire Co.

• **Ira J. Snader,** division manager of the Republic Aircraft Products Division of the Aviation Corp., Detroit, has been made vice-president of manufacturing. He will be succeeded at Republic by **Sterling B. Withington,** formerly general manager of the Brunswick-Balke-Collender Co., Muskegon, Mich. Mr. Snader became associated with the Aviation Corp. in December, 1940. For eight years before that, he was in charge of standard machine tool design and production at the Ex-Cell-O Corp., Detroit. He was one of the founders and the first treasurer of Ex-Cell-O. He was also assistant chief engineer in charge of tooling at the Wilson Foundry & Machine Co., Pontiac, Mich., and production engineer at Wright Aeronautical Corp., Paterson, N. J.

• **Victor H. Lawrence** has been appointed general superintendent

I. J. SNADER, vice-president, Aviation Corp., Detroit, and S. B. Withington, his successor as division manager, Republic Aircraft Products division of the Aviation Corp.

V. H. LAWRENCE, general superintendent, Otis Work, Jones & Laughlin Steel Corp.

Sheet Riveting . . .

. . . The following description of new devices for holding light alloy sheets in place for riveting was reviewed in the June, 1942, issue of Light Metals, London, based on Swiss sources.

are forced into the cavity of the die. The recoil of component (2) now upsets the rivet shank and forms the head (12).

Fig. 6, left and right, shows the die portion of the same holder adapted to special shapes by means of cut-outs (14 and 15). A special requirement is that the rivet shank must be cut accurately to length as the rivet head must possess a fixed diameter corresponding to cavity (6). If this is not so, the finished part cannot be removed.

The Becker design (B.P. 483,-663) is similar in type to that just described and is shown in Figs. 7 and 8. A casing contains two dies; the die has a helical slot which functions as a highly rigid spring, the die being normally pressed forward by a spring. A recess in the tool receives the rivet shank and centers it.

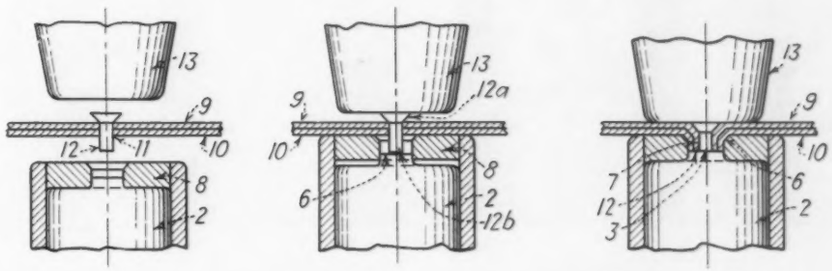
In a modification of this design, the die is replaced by one of partially spherical form which is provided with springs, these serving to damp unnecessary movement but at the same time to permit relative movement between tool and holder.

Fig. 9 illustrates a somewhat new type of holding tool or dolly, designed for structures, the complicated forming of which renders the use of the conventional holder difficult. Between the die and the grip are several intermediate components mainly of cylindrical form. These have oblique abutting faces and are connected with screws, the axes of which are perpendicular to the abutting faces. For the control of the body of the holder-on interchangeable extension pieces are provided. It is claimed as an advantage for this tool that it can be used for almost all types of riveting work if it be possible to approach the row of rivets from the rear.

The grip (1) is provided with an inclined fitting face (2) set preferably at an angle of 45 deg. and furnished with serrations (3). A screw (4) connects an intermediate section (5) with the grip (2). The intermediate section (5) is in turn connected with the clamping piece (7) by means of a dovetail and a screw (6). A further dovetail (9) holds the die (8) in position. The inclined faces permit adjustment of the tool to suit various angular positions. Between the first intermediate section (5) and the grip (2), a further extension piece can be inserted if necessary.

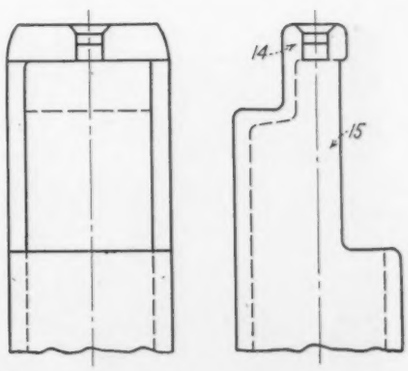
In most cases it is quite clear that these devices have been evolved directly to fulfill special needs in the aircraft industry. Consequently, for common engineering purposes, it is likely that many of the methods shown may prove, with increased degrees of standardization, redundant.

Nevertheless, the described jigs are of interest in that they demonstrate the highly specialized uses to which riveting and riveted structures in sheet are being put. Furthermore, in assessing the value of the devices shown, it is important to bear in mind that these may be purely of "local" significance and may depend almost entirely upon a favored current type or design of airplane, some slight modification in which will render a holder-on, as well as many other tools and jigs, obsolete.



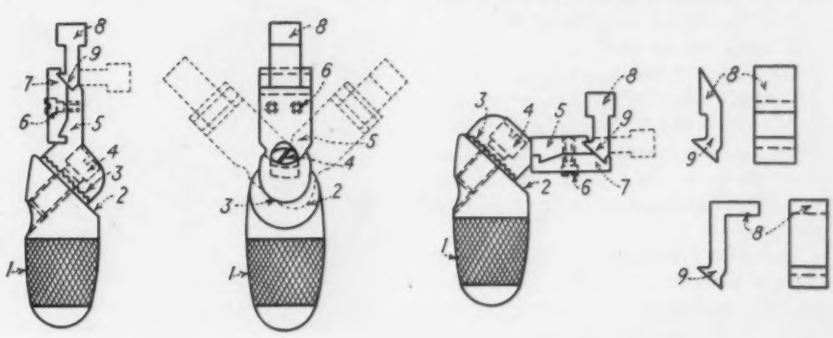
ABOVE

FIG. 5—Successive stages in simultaneous countersinking and riveting by the device shown in Fig. 4.



LEFT

FIG. 6—The die component of the device shown in Fig. 4 can be adapted to special shapes by means of cut-outs, as shown here.



BELOW

FIG. 7—This special device is adjustable for any angle and any working position, designed for structures the complicated forming of which makes the use of conventional type holders difficult.

Rust-Proofing Cadmium Plated

By BERNARD GROSS
Rohr Aircraft Corp., Chula Vista, Cal.

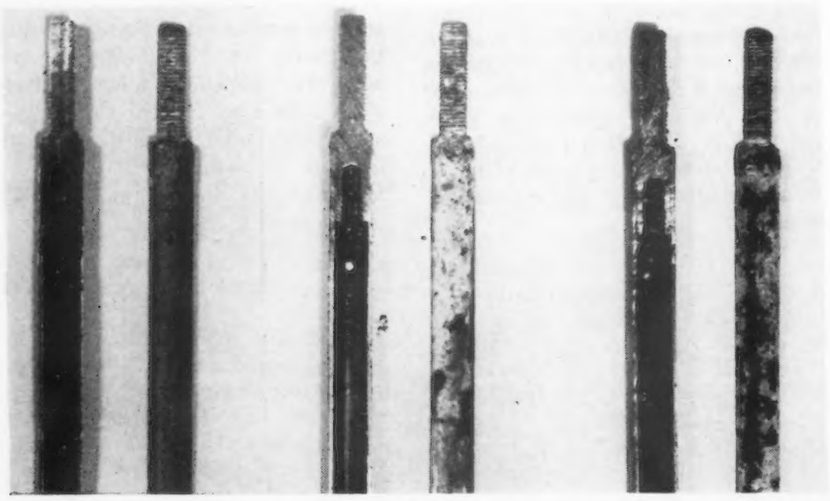
ONE cumbersome process in aircraft construction is the internal treatment of chromium-molybdenum tubular structures closed by welding. This process consists of drilling holes at the ends of closed tubular sections, flushing the inside of the tube with hot linseed oil under pressure, draining, and plugging the holes with cadmium plated drive screws.

The theory of obtaining effective rust proofing in tubular structures treated in this manner is very weak. Perhaps the attitude is that air tightness is not to be expected, and, since air is necessary for corrosion to proceed, a coating of linseed oil is believed necessary to protect the bare metal.

The effectiveness of this procedure is illustrated in Fig. 1, showing the comparative resistance of such structures to salt water corrosion tests using equipment described in the Army-Navy Specification, AN-QQ-S-91. Three cadmium plated tubes, which were salt-spray tested and cut into halves for examination, are shown.

The first tube, welded closed and salt-spray tested for 800 hr. did not exhibit any signs of corrosion, internally as well as externally, through the cadmium plating. The second tube was treated internally with hot linseed oil, in the usual manner. Salt-spray exposure totaling 700 hr., showed advanced corrosion internally as well as externally through the cadmium plating. Corrosion in this case started externally after 24 hr. exposure in the salt-spray.

The third tube was drilled so that air circulated inside of the tube, and no oil was used. This specimen, salt-spray tested for 700 hr., corroded somewhat worse than the second specimen. This indicated



ABOVE

FIG. 1—Gas welded chromium-molybdenum aircraft tubing. Left shows a welded closed tube, cadmium plated, that was in perfect condition after 800 hr. salt-spray tests. Center is tubing that was treated internally with hot linseed oil, with drive screws filling the holes in the tubing. The tubing at right was drilled but not plugged so that air circulated inside of the tube. Salt spray tests corroded this tube badly.

BELOW

FIG. 2—By heating a partially submerged, closed tube with a small hole drilled through the wall, escaping air or "breathing" can be observed.

Aircraft Tubular Parts . . .

that the "breathing" of air through the drive screw holes of the tube treated with hot linseed oil was responsible for corrosion of both the inside of the tube and the cadmium plating used on the outside. "Breathing" air between the walls of the drilled holes and the sides of the drive screws can be easily demonstrated by the simple method shown in Fig. 2. By heating a partially submerged, closed tube with a small hole drilled through the wall, escaping air can be observed.

The obvious conclusion of the tests made on the tubing, then, is that if tubular structures were welded closed and air tightness assured, it would be unnecessary to treat them internally with hot oil.

To obtain further information along these lines, specimens from the tail structures of airplanes in use more than 15 years were examined. The examinations revealed that no internal treatment had been used, and that the metal was corrosion-free and in perfect condition.

There are many closed tubular parts made today that are cadmium plated. Air tightness of such parts can be checked directly after plating. A blue spot develops at the leak soon after the final hot rinse and drying of the plated part, as shown in Fig. 3. In actual production over a period of several years, involving the manufacture of thousands of these parts, less than 1 in 5000 proved to contain a pinhole in the welding. Magnetic inspection is another reliable method for detecting any defect that would prevent air tightness in the part. The elimination of the hot oil process results not only in the saving of material, labor, and time, but makes possible a part that is even more resistant to corrosion.

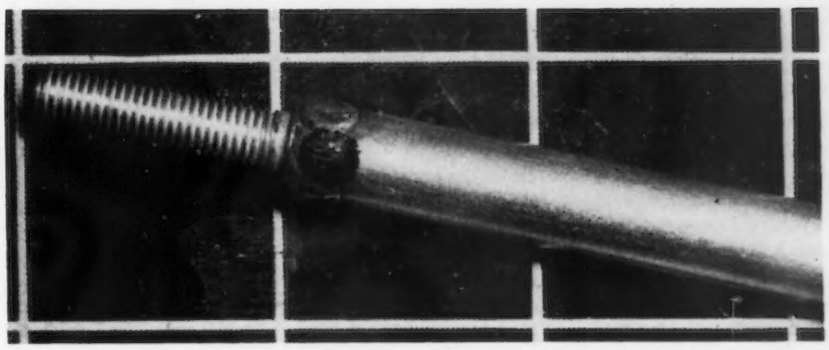


FIG. 3—After the final hot rinse and drying of the plated part, a weld that is not air tight will stain, as shown here.

Magazine-Type Holder Speeds Aircraft Riveting

A SPECIAL device for handling rivets is credited by the aircraft division of Murray Corp. of America, with helping to increase riveting efficiency by 25 per cent. The tool, which is 14 in. long and holds approximately 65 rivets, is called the Murray Riv-N-Jector. It controls rivet supply, both as to size and quantity, and thereby reduces losses caused by mishandling, mixing and fumbling rivets.

A mechanical hopper loading device fills the Riv-N-Jector, which is light in weight and can be held in the hand like a pencil. More recently it has been permanently attached to a riveting gun. In either case, no special instruction is required for the operator.

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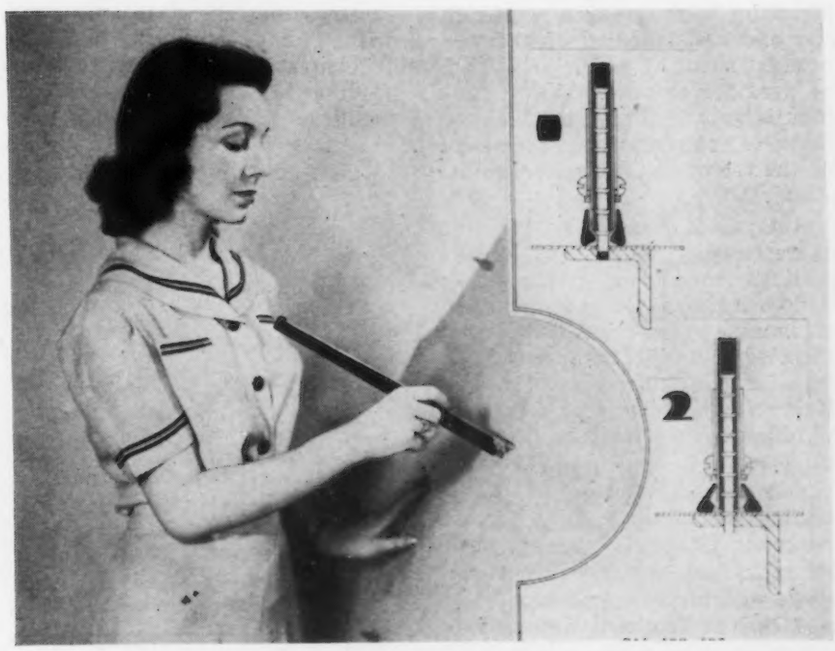


"Navy" Tombasil:

A COPPER-silicon-zinc alloy of the useful and versatile Ajax "Tombasil" family has been developed expressly for the war trend in non-ferrous castings. Its application releases tin used in bronze alloys formerly required for such castings.

In accordance with full laboratory and field reports, the physical properties of the new alloy known as Ajax "Navy" Tombasil, exceeds the requirements of either Government "G" bronze (88-10-2 or 88-8-4) specification 46M6G; "M" metal specification 46B8G; and the physical values stipulated in the Navy specification covering the copper-silicon alloys, known as specification 46B28. A comparison of the physical properties of "Navy" Tombasil with these specifications is shown in Table I.

The new "Navy" Tombasil, an exceptionally free-flowing metal, has a homogeneous structure and excellent sand-casting properties. It has an uncommon range of application for all purposes requiring large or small castings of a sound structure, high strength, workability, and resistance to breakdowns brought about by vibration. It may be used for certain pressure castings if proper precautions can be taken to compensate for shrinkage by the use of suitable risers, chills, etc.

Analysis of the observed physical characteristics and behavior of castings made from it shows that it does replace, in many instances, manganese bronzes, which are now specified in applications subject to considerable variety of strain. Hence its usefulness is especially significant in view of military requirements.

Yellow or high-brass alloys containing silicon have been known for many years. It was not until 10 years ago, however, that the alloys with higher copper and lower zinc, such as Tombasil, were investigated scientifically in three countries: The United States, Germany, and Japan.

o o o

By HOWARD LINN EDSALL

Ajax Metal Co., Philadelphia

o o o

Doctors Ray and Gould, of the University of Iowa, found that a valuable series of strong and workable alloys resulted with copper ranging from 80 to 98 per cent; silicon from 0.5 to about 6 per cent; and the remainder zinc, from about 1 to 19 per cent. Solid, homogeneous alloys, capable of being worked, were produced by increasing the silicon, if the copper was correspondingly increased and the zinc decreased. The silicon had the property of increasing the free-flowing properties by lowering the melting point.

Thus, silicon alloys are especially recommended for intricate and thin-section castings. "Navy" Tombasil, a silicon alloy, produces castings that are clean and sound, with greater strength, hardness, toughness, and elasticity than the common brasses.

Silicon forms solid alpha solutions in 85-15 brass if present up to about 2.8 per cent. When the silicon percentage runs above this point, a beta phase is formed, so that mixed alpha and beta phases are present in 85-15 brass when the silicon ranges from 2.8 to 5.2 per cent in the alloy. With increased copper, silicon forms solid alpha solutions or mixed alpha and beta solution, up to 6 per cent silicon. Ajax "Navy" Tombasil falls within this range of alloys, with approximately 90 per cent copper; 5 per cent zinc, maximum; and 5 per cent silicon, maximum (Patent No. 1,933,390).

However, in addition to the "Navy" type, the important higher zinc Ajax "A" Tombasil will be discussed, because there are interesting variations in pouring temperatures of these alloys. due to differences in zinc content. "A" Tombasil contains 13.70 per cent maximum zinc, while "Navy" Tombasil contains 5 per cent maximum zinc.

TABLE I

How "Navy" Tombasil (Average Bars) Compares with Minimum Specification Requirements

	Tensile Strength, Lb. Per Sq. In.	Elongation, Per Cent In 2 In
"Navy" Tombasil	54,750	44
U. S. Specification 46B28, (copper-silicon alloy)	45,000	15
Government "G"— 46M6G:		
88-10-2	40,000	20
88-8-4	40,000	20
Government "M"— 46B8G	34,000	22

Foundry Handling

In the manufacture of Ajax Tombasil, the constituents are perfectly alloyed, making the use of metallic fluxes unnecessary to insure a sound, clean production of castings.

Tombasil should preferably be handled under pyrometric control because of the importance of pouring temperatures. Nevertheless, as frequently happens where no pyrometers are available, practical rule of thumb methods by which correct pouring temperatures may be had in the foundry are satisfactory. For example, in crucible furnace melting, the higher zinc "A" Tombasil ingots are added until the last of the charge disappears below the surface of the molten metal. At that point, the temperature will be very close to 1950 deg. F., and the metal can be poured on removal from the furnace; the drop being some 50 deg. during a normal 3

A New Silicon Bronze Casting Alloy . . .

min. period required for the operation. This gives an average pouring temperature for general jobbing work of 1900 deg F. Similarly, in the case of "Navy" Tombasil, which contains less zinc, the metal in the crucible will have reached about 2050 deg. F. when the last ingot disappears below the molten metal. The metal can be poured on removal from the furnace, the drop of 50 deg. giving the normal pouring temperature for this metal of about 2000 deg. F.

In both cases, liberal use of charcoal is recommended; charged in the crucible along with the solid metal and kept covering the molten metal at all times. Rapid melting in quick-melting crucible furnaces is preferred. The actual pouring range of "Navy" Tombasil is between 1900 and 2100 deg. F., while the pouring range of the higher zinc "A" Tombasil is between 1850 and 2000 deg. F. These metals should not be overheated; and should be cast without soaking or remaining in the furnace after being made ready for pouring.

Coke is recommended for fuel in pit furnaces to insure this quick melting, because coke-coal mixtures or coal alone will result in slow melting and possible porosity in the finished casting. The crucible should be continuously charged with preheated pigs, sprues, etc., to avoid chilling the bath. Where open flame furnaces are used, the hearth should be kept clean and free from contamination with other metals. Likewise, scrap should be kept unmixed with any other nonferrous metals.

Casting Tombasil Alloys

Gates should be cut in such a manner as to produce a choking effect, necessary for clean castings. The sprue should be twice the cross-section of the runner gates so as to enable the pourer to keep the sprue filled. Gates should be so arranged as to introduce the metal quietly, without splashing or turbulence, and the sprue itself should be funnel-shaped at the top to facilitate pouring.

. . . "Navy" Tombasil is the latest addition to the line of Tombasil alloys. Tombasil is the name of the basic group of silicon-zinc alloys for sand casting, on which Ajax Metal Co. has done considerable research and development.

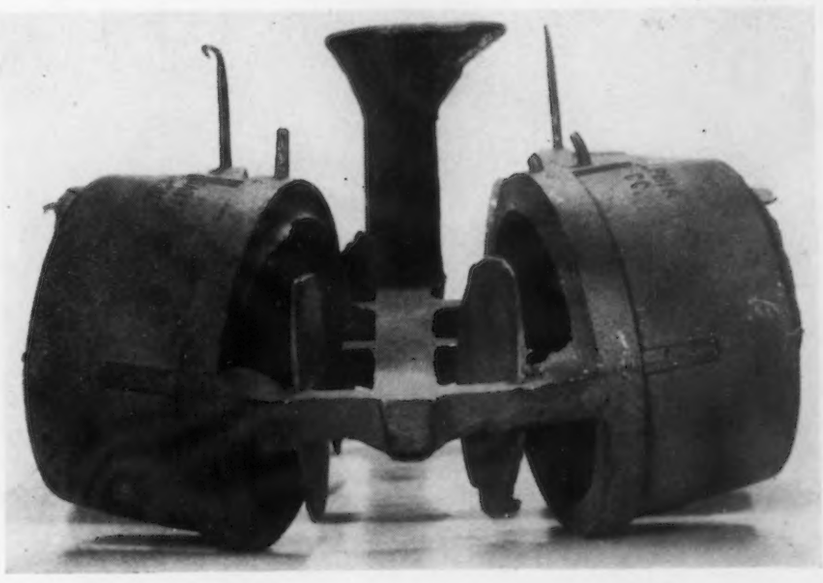
Molding sand and cores present no special problem. Ordinary practice recommended and generally followed for 85-5-5-5 alloys will yield good castings. The shrinkage of "Navy" Tombasil, for example, is found to be midway between red brass and manganese bronze. This means that more liberal risers should be provided than when casting ordinary red brass, especially for castings with both thick and thin sections and those for high pressure work.

It may be observed that in the manufacture of silicon bronze alloys generally, more exacting metallurgical control is required than in the case of copper-tin bronzes. This is due largely to extreme differences in the melting points of the component elements combined with the fact that silicon oxidizes readily. Nevertheless, ingot metal of the Tombasil alloy is regularly produced in large tonnages and used successfully by many foundrymen for castings of various types. Some of these will be discussed solely from the point of view of foundry practice and handling.

Fig. 1 shows a spray of hose couplings as they were removed from the mold and sandblasted. This spray was produced from "Navy" Tombasil in ingot form.

The foundry melt was handled

FIG. 1—Tombasil hose couplings, with runner and gates in the drag.



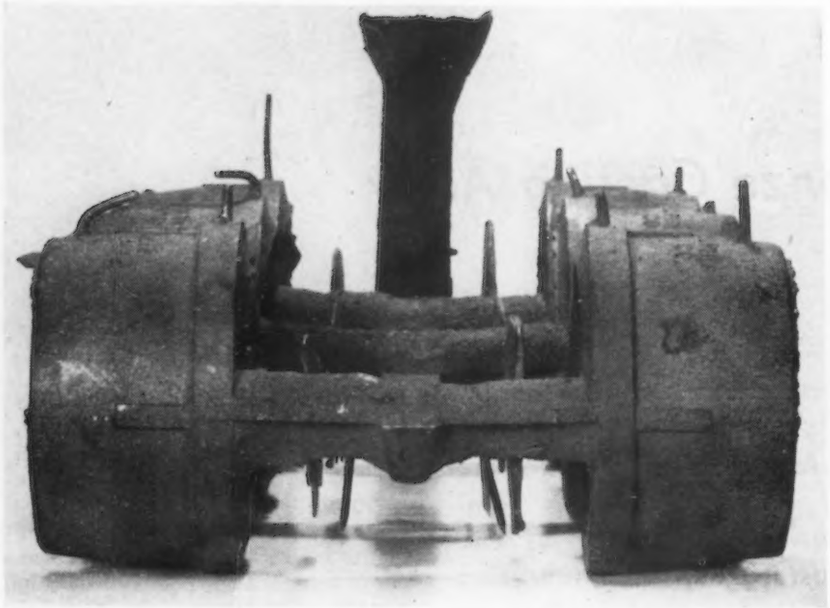


FIG. 2—Revisions in the gating procedure produced successful couplings. The gates extend into the cope as well as the drag.

in an oil-fired, crucible lift-out furnace, with a small amount of charcoal placed in the bottom of the crucible before charging with the solid metal.

Since this was the "Navy" type Tombasil, with zinc about 5 per cent, the maximum temperature reached in the furnace during the melting operation was 2150 deg. F., and castings were poured in green sand at 2000 deg. F. Advice from the foundry where these castings were made discloses that Albany No. 1 sand was used, more or less standard in this foundry for silicon bronzes. The sand was worked more on the dry side than usual; and it was not rammed too hard, a precaution usually followed for aluminum alloys and manganese bronze. Core practice in this foundry is the same as that followed for ordinary red brass alloys, the actual core mixture being 50 per cent silica sand, 50 per cent new Albany sand, mixed in the proportion of 1 to 60 with linseed oil. Soft cores have been found to give best results.

On the first casting attempt, it was observed that all castings made from this pattern showed leaks

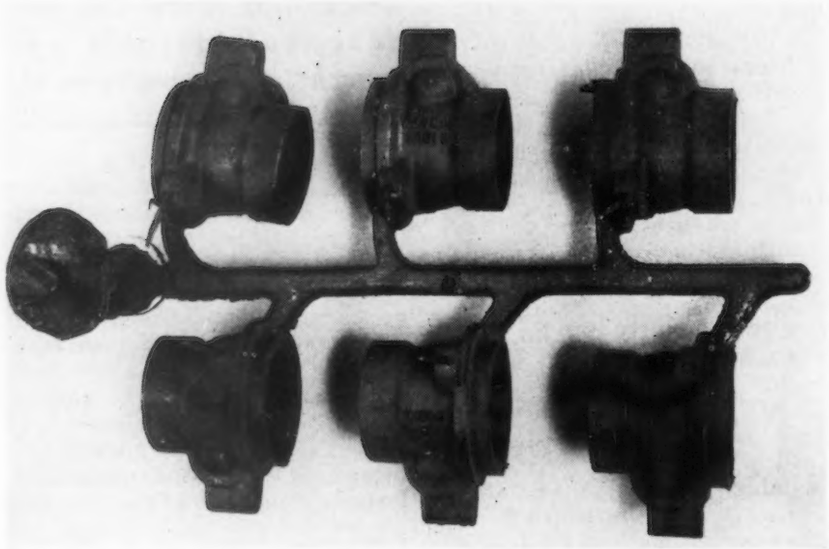


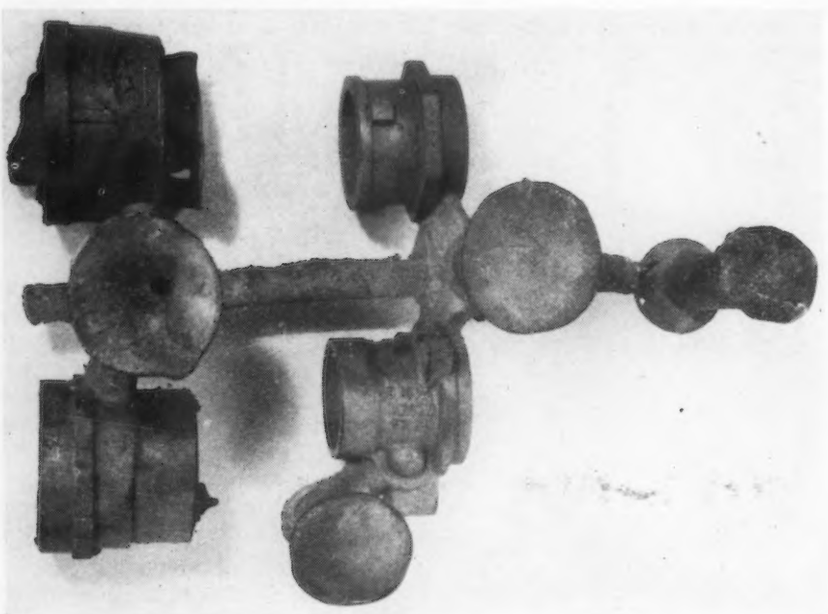
FIG. 3—A spray of faucet ends. The gates are in the cope, an unchanged red brass pattern, used for silicon bronze test castings. These castings leaked.

when subjected to 90 lb. hydraulic test pressure, and it is interesting to observe that both the runner and gates are in the drag. A second casting was made, as shown in Fig. 2, with additional gating in the cope and with all factors of temperature maintained as before. The castings made after this single change in gating were satisfactory and withstood the 90-lb. hydraulic pressure tests.

It seems reasonably clear that this preliminary failure was due to gating, and that the final result obtained indicated that silicon bronze in the form of Ajax "Navy"

BELOW

FIG. 4—Gated with deliberately oversized risers, Tombasil castings withstood the hydraulic test required for faucet ends and hose couplings.



Tombasil can be successfully used for castings of this type.

Faucet Ends

Another spray of castings, poured from the same heat of metal and at the same temperatures used for the hose couplings, is shown in Fig. 3. These are faucet ends and comprise part of an oil transfer piping equipment. They must withstand the same 90-lb. hydraulic pressure as the hose couplings.

A pattern designed originally for red brass was deliberately selected for this experiment in order to make direct comparisons with the behavior of silicon bronze and red brass. Castings made in this manner leaked without exception. However, the leaks obviously were confined to one section, the heaviest portion farthest from the gate.

Bearing in mind the experience with hose couplings, the foundryman directing the work was of the opinion that some change in gating practice was indicated. That this proved to be correct is illustrated in Fig. 4. Excessively oversized risers were utilized to demonstrate the point of practice involved, and the castings showed no leaks under pressure.

Thinking in terms of tensile strength requirements involving 65,000 and 70,000 lb. per sq. in., Grinnell Co., Inc., Providence, R. I., observed that when "A" Tombasil (copper 81.50 per cent, silicon 4.80 per cent, and zinc 13.70 per cent) was substituted for manganese bronze, the resulting castings were superior from the standpoint of appearance and soundness, with sharp reductions in production time and costs because the number and size of the risers could be reduced. They observe, further: "As Tombasil combines stiffness with ready machinability, the cast product has shown satisfactory physical properties and has presented no finishing problems."

The desirability of giving careful attention to melting and pour-

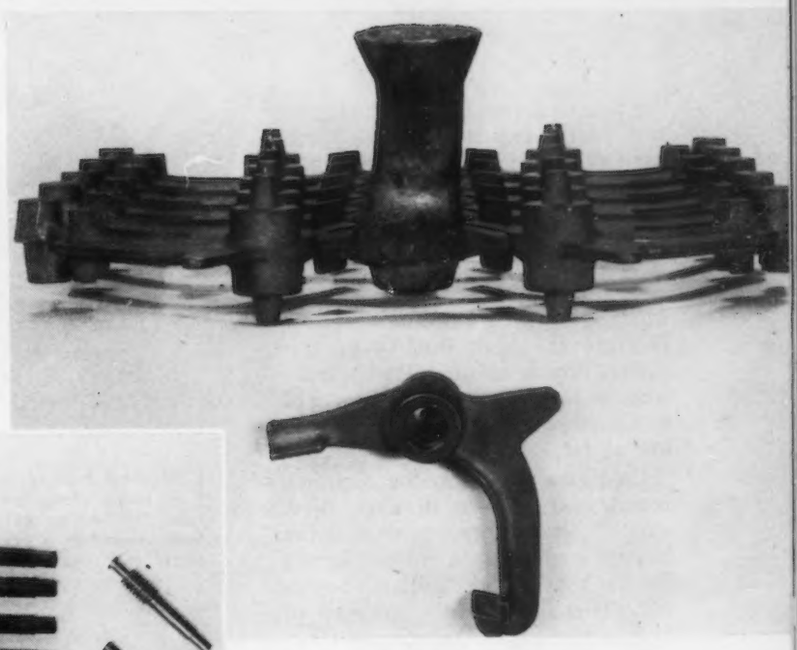
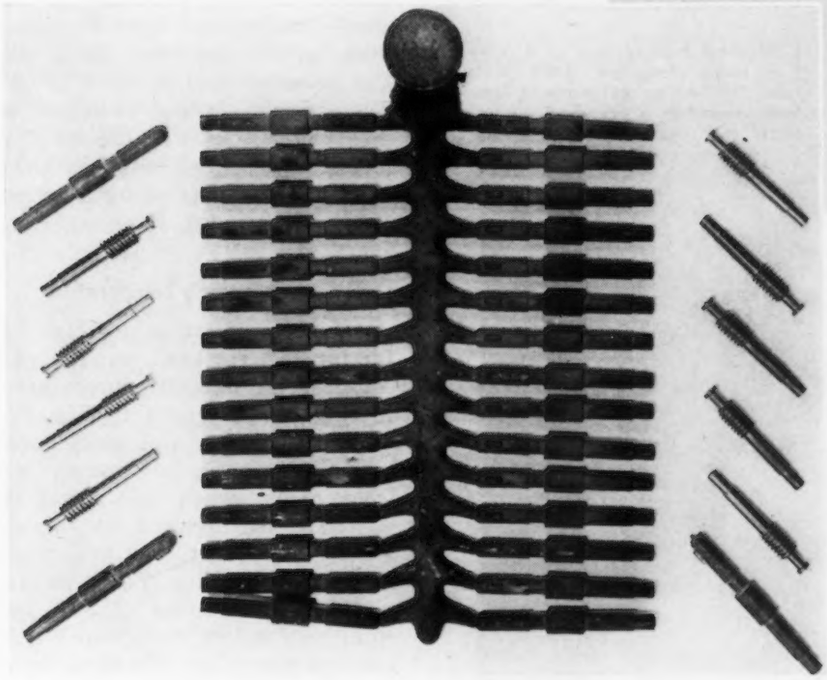


FIG. 5 — Automatic sprinkler equipment castings made by the Grinnell Co. This spray of latches were just removed from the sand. The end section shows the type and size of the gates.



ABOVE

FIG. 6—Valve spindles made of Ajax Tombasil, shown in a spray of castings, in the rough and finished state. Color when finished is a bright, silvery bronze, verging toward polished gold.

o o o

AT RIGHT

FIG. 7—Castings for automatic sprinkler equipment shown here are water clappers.

ing temperatures is confirmed after two years' experience with Tombasil, the indications being clear that high temperatures contribute the major cause for casting porosity and foundry troubles in general. It is a difficult thing for the average foundryman, who has been working with tin-bronzes, to appreciate the high fluidity of this silicon bronze alloy at low pouring temperature and value of consistently maintaining temperatures as low as feasible.

Castings made in the Grinnell foundry are shown in Figs. 5, 6, and 7. Of the group shown, the largest casting is a water clapper for dry pipe valves. This must operate under a working pressure of 175 lb. per sq. in. and the castings must withstand a shop test of 300 lb. per sq. in. of water pressure.

The latch castings shown in the complete spray are part of the same assembly, subjected only to strength requirements without pressure. It may be stated concerning this group that production castings have been made from Ajax "A" Tombasil ingot for the past two years.

The small spindles and spray also represent a component of a small globe valve assembly produced from a Tombasil alloy containing approximately 4 per cent silicon; 15 per cent zinc; ¾ of 1 per cent lead; and the remainder copper. The lead addition facilitates machining for high-speed production requirements. All castings in this group were cast from ingot metal, melted in the foundry in natural draft, coal-fired pit furnaces, the pouring being done in green sand molds at 1900 deg. F.

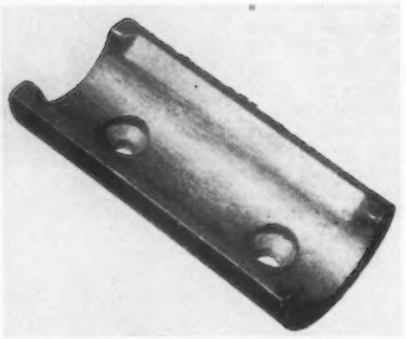


FIG. 8—A bearing used on a series of large newspaper rotary press rolls. This bearing was made of Tombasil, melted in a coke-fired pit furnace and poured in green sand molds at about 1900 deg. F.

FIG. 9—This small pressure casting was made of "A" Tombasil, melted in a coke-fired pit furnace and poured in green sand molds at a temperature between 1900 and 2000 deg. F.

Bearings

While the silicon bronzes are not considered primarily bearing metals, Fig. 8 shows a small bearing used on a series of large newspaper rotary press rolls. It is reported that this Tombasil alloy has been used successfully for such bearings during the past seven years, and that the original bearings are still in operation. Service investigation shows that such bearings are generously lubricated, and, practically speaking, this would seem to be one of the main factors contributing to such long service in this exceptional case.

Fig. 9 shows a small pressure casting produced regularly in the same foundry and from the same alloy as the bearing. Metal for this pressure casting, which is "A" Tombasil, was melted in coke-fired pit furnaces, as was the bearing metal, and poured in green sand molds at a temperature between 1900 and 2000 deg. F.

Excessive Pouring Temperatures

A high temperature, too high by far for "A" Tombasil, was the sole cause of the difficulty encountered in the casting shown in Fig. 10, left. It is a waster, of course, and is virtually a perfect example of what occurs when this metal is poured at too high a temperature. When subsequent castings were poured at 1900 deg. F., as shown in the single casting of Fig. 10, right, the defect disappeared and castings were clean. These castings likewise were poured in green sand molds.

An interesting photograph of five test bars is shown in Fig. 11. Note the different types of gating involved. The bars were made of "Navy" Tombasil, and the values appear in Table II.

In conclusion it may be said that there are three important factors to consider in casting these silicon bronze alloys: (1) The element of shrinkage; (2) the control of the melting and pouring temperatures; and, (3) the control against contamination from other alloys. However, it will be recognized that these same precautions are observed in the foundry when handling such alloys as manganese bronze and aluminum bronze. Therefore, the casting of these silicon bronzes should not be looked upon as calling for any unusual procedures with which the foundryman is not familiar. This discussion has been confined strictly to sand castings, and the sample castings represent only a few of the ap-

TABLE II

Five Test Bars of "Navy" Tombasil*

No.	Test Bar Type	Pouring Temperature, Deg. F.	Tensile Strength, Lb. Per Sq. In.	Yield Strength, Lb. Per Sq. In.	Elongation in 2 In., Per Cent	Reduction in 2 In., Per Cent
1	Webert	1960	58,000	22,100	36.5	34.7
2	Wedge block	1950	55,000	19,950	29.0	31.2
3	Ingot (chill)	1940	62,800	22,400	34.0	32.1
4**	Webert	1930	58,400	22,200	32.5	34.5**
5	Wedge block	1920	54,600	21,200	29.0	32.1

*—Test bars all poured from the same crucible.
**—Hardness test showed Brinell number of 105.

plications for which these alloys are now being used. And because metal resources are of extreme interest and importance in the present critical period, the foundryman is contributing to the national effort by giving every consideration to the substitution of silicon bronzes for copper-tin alloys. If there is a marked trend in the literature encouraging the use of silicon bronzes today, it is fortunate in respect to metal availability that the substitution of silicon has practically limitless possibilities because, next to oxygen, silicon is the most abundant element on earth, compounds of it constituting more than one-quarter of the earth's crust.

That is why much research and development continue along the line of using silicon in copper-base alloys, some of which are simply copper, silicon and zinc; while others contain, in addition, manganese, iron, aluminum, tin, and other metal traces. In the new types of Tombasil, an alloy of copper and zinc, having silicon substituted for the tin, may be found an extremely useful foundry metal. Any practical observations made in any foundry concerning such metal are worthy of the widest possible publicity among foundrymen to conserve the vital and diminishing stocks of tin and thus help guard against a likely shortage of this metal during the war.

FIG. 10—A high temperature, too high for "A" Tombasil, was the cause of this waster. Subsequent castings poured at 1900 deg. F. were successful, as shown in the machined casting at right.

FIG. 11—Five test bars of "Navy" Tombasil, as described in Table II, with various types of gates recommended in using this silicon bronze alloy. These bars were all made from a single heat of metal.

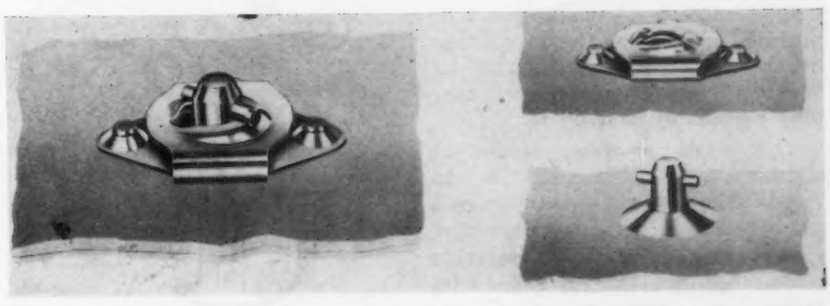
Aircraft Cowl Fastener

SIMPLIFIED design and proven performance are characteristics of a new Shakeproof fastener, said to provide a quick, secure method of attaching aircraft cowling and other removable parts. The assembly consists of three parts—main spring, stud and cross pin, and is installed with two special tools. A series of tension, torsion, vibration, shear and fatigue tests have been run to determine its performance characteristics, and the device has passed official Air Force tests.

To install the fastener the main spring is riveted in place over a drilled or punched clearance hole in the inner surface sheet. The stud member is inserted in a matching clearance hole in the outer sheet, and the cross pin is then press fitted in the stud with special pliers. A clockwise quarter turn locks the stud and pulls the parts together with a powerful dual spring tension. The stud is stopped in position by detents in the cams of the main spring, and proper closure is visually identifiable.

The fastener is said to reinforce the adjacent structural area, presenting no stress hazards. It provides limited deflection with high initial axial tension, and compensates for the usual variations in commercial aluminum sheet thicknesses. Application can be made to a wide variety of parts, including curved surfaces.

Shakeproof cowl fasteners are manufactured in two sizes to conform to AN strength classifications 5 and 7 (up to 500 and 700 lb. tension, respectively), and with flush, oval and wing head studs. Standard units accommodate total material thicknesses ranging from 0.035 to 0.254 in. They are a product of the Aviation Division of Shakeproof, Inc., Chicago.



Locked position, left, of new device for assembling cowling and other removable aircraft parts. The illustrations at the right show the assembly attached to the sheets to be fastened together. A quarter turn of the stud locks and unlocks the fastener.

Portable Tool Maintenance

° ° °

THE application and operation of portable power tools for grinding, buffing, sanding, drilling, reaming, etc., involves perhaps three major problems. First, the correct tool must be selected for the job; a tool with the correct speed and power, light in weight, and with the proper cutting accessories to obtain maximum metal removal.

Second, the initial power and performance of portable tools must be maintained by proper lubrication and service, both for the tools and the power supply, such as air compressors, motor generators, etc. This task depends largely upon the maintenance department of a plant, which should be prepared to handle a variety of portable tools frequently used in two or three shift operation. The maintenance personnel in the metal working plants, of course, has been expanded tremendously by the war production program. The same problems of inexperience and lack of maintenance knowledge are present in this division of a plant as in the production departments. Proper and efficient maintenance of portable tools helps the production departments meet their quotas by keeping tools at top efficiency over long periods of time.

The third problem, somewhat similar to the second, is to repair the normal wear caused by round-the-clock operations and avoid breakdowns of portable tools, thus prolonging their life. Designers of portable tools use excellent steels, ball bearings, and other equipment for a maximum of efficient life, but inadequate maintenance can easily reduce this ultimate tool life as well as reduce the productive output of the tools. Moreover, unintelligent maintenance will often increase the consumption of critical materials used in repair parts of these tools.

Producers of portable tools provide the usual maintenance instructions with new tools, but with the inexperienced help often necessary in maintenance operations and considering the importance of the job of keeping tools in productive condition, supplemental information of this nature is needed. Interest must be aroused among maintenance men of the importance of the maintenance operations, the proper procedure of using and applying the information already available, and the extension of the sphere of the maintenance job to realization of conditions under which the tools operate.

The "Rotor Tool Conservation Plan," prepared by the Rotor Tool Co., Cleveland, emphasizes the importance of proper maintenance and describes and emphasizes the general operations applying to power tools. Also, maintenance operations peculiar to Rotor tools are described in detail. A poster, designed to attract interest in the subject of maintenance, has also been designed, containing general instructions that apply quite largely to all makes of portable tools. In a booklet, "Keep 'Em Running," the subject of air tool maintenance is discussed. The subjects of lubrication, clean air, moisture, safety, starting a new tool, and what to do when a tool loses power are the broad topics covered.

Although any good grade of acid-free, medium machine oil is satisfactory for air grinder and drill lubrication, best results are obtained with oils designated to provide better lubrication under the moist air conditions which are usually found in pneumatic tool operation. Air line lubricators will materially prolong the life of any tool, particularly small tools which do not have an oil reservoir. Air tools, except the smaller ones, have a reservoir of sufficient capacity to last about 8 hr. of one shift, and this reservoir should be filled regularly.

Grease is used in the ball bearings and in the gear case of air drills. Ball bearings should be washed in clean solvent and repacked with a good grade of light grease every two or three months,

unless they are the double-shielded type which are pre-greased. In this case, wiping clean instead of washing is sufficient.

Next to proper lubrication, clean, dry air is the most important factor in the efficient operation of air tools. The compressor intake should be screened or filtered with renewable elements to keep the dirt out of the air cylinders of the tools. Even if the air is filtered, dirt and scale may be carried into the tool from the pipe lines, and an air strainer should be provided on all tools to protect the working parts of the air motor from damage by foreign matter and pipe scale.

Moisture in Tools

Moisture is detrimental to pneumatic tools because it washes out lubrication and rusts the interior parts of the tools. An aftercooler, installed at the compressor is the best way to eliminate such trouble, but water separators or traps ahead of the tools will help dispose of condensation in the lines. These traps, if not automatic, should be drained regularly and the air receiver should be drained. An excellent way to combat wet air conditions is to pour oil in the handle of the tool when finished for the day or when storing it, and touch the air to it so as to blow the oil through the tool.

Safety goes hand in hand with good maintenance. Wheel guards, goggles, and face shields, proper wheel selection, tool speeds, check of new tools, and assembly of tools; as well as other similar precautions are neccessary and vital to high rates of production.

While it is obvious that each make of tool requires specific instruction relating to the detailed construction and care of the tool, general instructions in the booklet, "Keep 'Em Running," are applicable to most any pneumatic tool as well as to Rotor tools. For example, mention is made of a simple point which has often been noticed, namely, that a workman must be careful to see that the air ports are kept in line and not blocked off when end plates of tools are reversed. While this will not happen but once out of four or five times when the change is made, it is extremely puzzling to an inexperienced maintenance man.

A more or less standard routine is prescribed for what to do when an air tool loses power. A check of the air strainer should be made

to see that it is clean. Rotor blades should be examined to see that they are not stuck, and badly worn or broken blades should be replaced. Dirt often clogs the governor, preventing it from operating freely. Leaks in air lines and low air pressure, (under 90 lb. at the tool) are often the cause of power losses in the tool. Low air pressure may be the result of trouble in the compressor. The air hose bushings often are the cause of power losses in a tool. Wherever possible, ¾-in. hose instead of ½-in. hose should be used, and large bushings should be used so as not to restrict the air flowing through the line.

Tool Service Plan

Service engineers of Rotor Tool Co., go over the entire subject of maintenance with the maintenance man or a small group of maintenance people in a plant, explaining the entire system prescribed in checking over the usual repair parts sheets in the shops. All companies manufacturing portable tools issue such sheets, showing the parts numbers and giving any specific instructions required, but usually these sheets never reach the maintenance shop or are lost. The Rotor service engineer, therefore, looks up the types of tools in a shop or plant, takes from his portable files a set of the exact sheets needed to cover these tools, places them in a heavy binder, and leaves them with the repair man in charge of maintenance. These sheets, provided by the Rotor service engineer, are on any type, make, or standard design of air tool that may be found in the shop, and do not apply only to Rotor tools.

Emphasis is made by the service engineer that certain parts are designed to take the wear and other parts are not. He suggests that the ordering of service parts should be on a sensible basis so that maintenance departments have on hand only a limited number of parts that are designed to take the wear, and do not have on stock an unnecessarily large supply of parts that might never be used. This will not only take care of emergency breakdowns and usual repairs due to wear, but will help greatly in the conservation of critical materials such as bearings, and aluminum, and copper parts. Unneeded parts, it is suggested, should be returned to the factory to be thoroughly inspected, with a charge made for inspection, but credit to be given for parts returned against purchase of those really needed.

The Rotor Tool Conservation Plan is a development or an extension of the basic service help that all portable tool manufacturers have been giving customers for years. However, the plan goes further down through the organization to the actual man on maintenance, both through the use of printed material and mainly, the service engineer. These service engineers know what they are talking about, are factory trained, and can, and often will, take off their coats and do the job themselves. Portable power tools, the "baby machine tools," are doing their share to win the war, and manufacturers are prepared and willing to extend their help to aid in the maintenance and conservation of these tools.

BEAUTIFUL BUT VICIOUS: These Lockheed P-38 Lightnings with American crews are on war duty. This one-man pursuit is powered with two Allison engines delivering 2300 hp. The armament in the nose, in front of the cockpit, delivers a wallop that can saw a bomber in half. Photo by Richie for Curtiss Propeller Division. o o o

Press-Forge Joining Aluminum and Steel

o o o

THE Presswerk-Derendorf of Rheinmetall-Borsig has recently developed a method of press forging for the integral joining of steel or heavy non-ferrous insertions in a forged light-metal body, according to a report in the June issue of *Light Metals*, London. This process, it is believed, is also being carried out in England. Unfortunately, complete details as to the precise method by which this is accomplished are not available, so discussion must, therefore, be limited largely to the potentialities of the process.

In many applications of light and ultra-light alloys, it is essential that working surfaces possess mechanical properties or hardness values greater than those commonly achieved with aluminum or magnesium. In this way lightweight construction is not sacrificed, but, at the same time, the desirable wearing properties of steel are obtained.

In the process evolved by the German concern, steel parts are forged directly into high-strength wrought alloys. The finished work is said to possess very superior characteristics insofar as the heavy-metal insert is inseparably fixed to the light-metal body.

The question of the risk of corrosive attack naturally arises. The formation of a couple between ordinary carbon steels and aluminum might well lead to serious results, especially if any porosity existed in the neighborhood of the steel-aluminum alloy interface.

However, the high pressures employed in the forging operation insure that this is not so, thus the body of the forging is immune from such corrosion. As to the exposed faces or junctures, these may easily be protected by means of suitable paints. Alternatively, in special cases, steel inserts can be fully covered and protected by the surrounding light metal, so that the junction of the dissimilar metals is entirely guarded against attack by corroding fluids or gases.

In other applications of this process, involving the forging-in of heavy nonferrous metal (for example, brass) or stainless steel inserts, two extreme cases are represented. Brass or bronze inserts must be carefully protected to avoid the occurrence of strong electrolytic corrosion phenomena, whereas the use of stainless steels is highly to be recommended as the couple formed between these materials and aluminum alloys is, in general, weak.

Known facts about the process indicate that the light metal intended for the body of the forging, having been heated to forging temperature, is subjected to a modified forging process, during which the cores or inserts of heavy metal, also heated, are pressed into the light-alloy mass. The inserts are serrated to prevent rotation, and, when the forging is completed, the light alloy

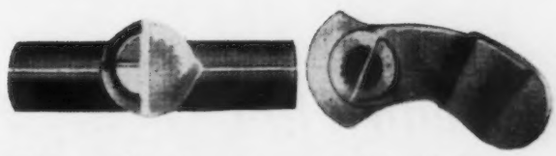


FIG. 1—These levers are provided with forged-in steel bushes, which act as working faces in the completed assembly.

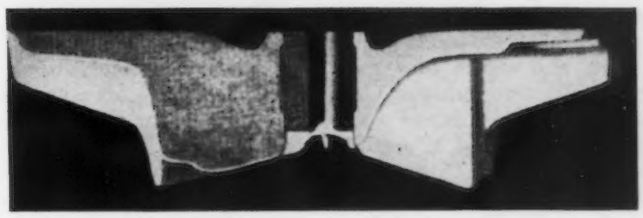


FIG. 2—A cut-away view of a ventilator wheel with a forged-in hub.

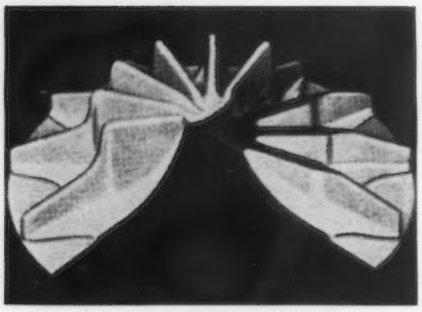
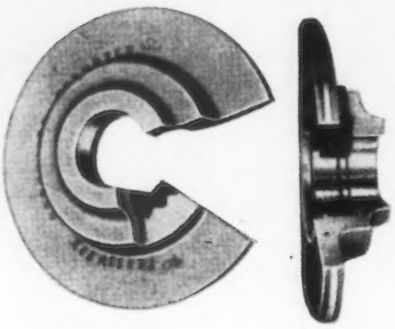


FIG. 3—Another view of a ventilator wheel with a forged-in hub. All the advantages of light weight are here, coupled with capacity for heavy duty work.

BELOW

FIG. 4—This light-metal body has a steel ring insert for receptions of ball-bearings. The use of this device eliminates loosening of the bearings in operations.



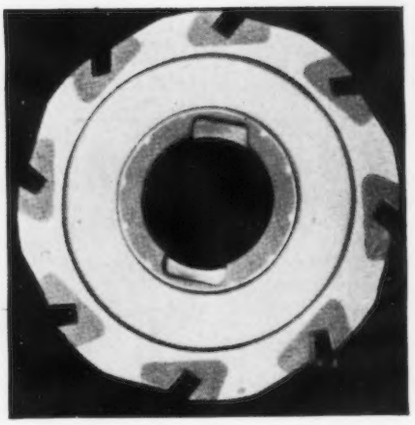


FIG. 5—This wrought light-alloy milling-cutter head has a steel hub and steel tool holders.

shrinks around the insert providing an immovable combination.

In Fig. 1 are shown two levers with steel bushes which, as may be seen from the cross-section, are corrugated in part. The projecting steel faces serve for the engagement of other working parts and provide the high deformation resistance, strength, hardness, and wear resistance demanded in such cases.

Figs. 2 and 3 present a part section view of a ventilator fan provided with a steel hub. Heretofore, it has been common practice to make such hubs in two parts, the hole being very accurately centered and fixed by screwing or riveting. By forging in the hub, weight is saved, together with time and cost of fixing. In this instance a light alloy with a tensile strength of 27 tons per sq. in. is used, the hub being in an 80-ton nickel-chrome-molybdenum steel.

Fig. 4 illustrates a ball bearing housing, the use of which eliminates any danger of the outer race of the bearing becoming loose in the body of the forging, as may commonly happen in service if such a bearing be fixed directly into the light metal without the aid of a firmly located bush. The steel bush in this case is also serrated on its outer surface, giving a larger surface for fitting, and obviating any danger of rotary movement when heavily loaded in torque.

An interesting possibility is shown of the development of light alloy tool holders, as illustrated by the light metal cutting head in Fig. 5. This is provided with a steel hub and with steel inserts for the reception of tools.

Discredit Film Theory for Stainless Steel

CORROSION resistance of 18-8 stainless steels can be improved by treating its surface with hydrochloric acid, 3N to 12.5N, containing an inhibitor. This treatment accomplishes much the same results as the current practice of so-called "passivation" in nitric acid, and shows that the improvement is not unique to oxidizing acids.

In fact, the results of a series of tests made by H. H. Uhlig and E. M. Wallace, and presented as a paper before the Electrochemical Society, appear to confute the theory that improvement through the use of nitric acid is accomplished by alteration of an oxide film surface.

The inhibitors used in the hydrochloric acid were quinolin ethiodide and a commercial pickling inhibitor. Corrosion resistance was determined by exposure to 10 per cent ferric chloride, followed by observation of the weight loss and the number of pits formed. The higher concentrations of acids improved the corrosion resistance of the specimen surface, except that it was found that 12.5N acid produced the same or lower resistance to pitting as compared to 9N acid.

Since hydrochloric acid is known to be one of the most effective agents for destroying passivity, there is some doubt that the corresponding improvement by nitric acid is actually accomplished by increasing the oxide film surface of the steel. It appears rather, that the results are accomplished by preferential solution of anodic areas, thereby forming a metal surface electrochemically homogeneous and free from pit nuclei. This preferential solution of surface metal is accomplished by mild etching which smoothes and brightens the surface, thereby improving its appearance. Oxidizing acids and anodic treatment, in addition to equipotentializing the surface, remove interstitial hydrogen. The latter, when present, may be a barrier to maximum passivity of the alloy.

New Lenses Eliminate Glare in Welding Aluminum

No longer does brilliant glare from the hot hydrogen welding torch blind the operator in aluminum welding so that he must work entirely from experience without actually seeing the operation. The new lens combinations permits the operator to see the "working puddle" of molten aluminum.

PERFECTION of new welding goggles that will help speed up production of Hudson bombers and Lightning P-38 interceptors by entirely eliminating glare from aluminum welding operations, was announced at the Lockheed Aircraft Corp. These goggles will be made available to all airplane manufacturers.

Aluminum welders have been severely handicapped by the glare from the hydrogen torches, which caused severe eyestrain and hid their work from direct view, making welding a difficult operation. This glare is caused by the low temperature at which aluminum melts, the high temperature of the hydrogen torch, and the large amount of flux required in this type of welding.

This glare problem was solved by Dr. R. C. Burt, a member of the Lockheed plant engineering department, who, with the help of Corning glass works technicians, produced a pair of goggles with the optical properties that would filter out the glare. As now used by Lockheed welders, the improved lenses allow a small cone of flame to be seen at the burner tip.

For other information on eye protection in welding, see THE IRON AGE, *issues of March 26 and April 2.*

Not only has the work speeded up but some welding operators had never been able to read or attend movies because of headache and eye fatigue. Since they started wearing the new anti-glare lenses, they do either or both without ill effect.

Dr. Burt attacked the problem from the filtering angle. An analysis of the flame indicated the undesirable rays, and, through a series of experiments, a combination of light filters was found which not only filtered out the undesirable rays but passed sufficient light of other wave lengths to give good visibility of the work.

From the absorption curve of this filter combination it was possible to select two glass filters which combined gave the desired results. After months of cooperative research, with Corning experts making glass samples and Dr. Burt cutting, grinding and testing, a pair of goggles was produced with all the desired optical properties.

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HELPING to speed production at one of General Electric's factories is this ingenious arrangement using an electrically heated carbon tip for the soldering of plate-type rheostats used for motor and generator control. The assembled rheostat plate is placed in a grounded ratchet fixture. The carbon tip is lowered into contact with one of the several rheostat buttons to be soldered, the button is quickly heated, and the solder applied. The operator then indexes the plate by foot pedal to bring other buttons into position for soldering. Formerly this was a completely manual operation with a soldering iron, taking more time and requiring a great deal of soldering iron maintenance.

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Skin Troubles in Welding

AN American medical journal recently published a note concerning the irritation of skin from substances used in welding. It is claimed that most welders have burns and skin irritations at some time during the course of their trade experience. Dermatitis (inflammation of the skin) due to the wearing of various protective equipment, such as leather gauntlets and rubber gloves, has been described.

This, the medical expert points out, is a hyper-sensitivity to the particular article of clothing rather than to any part of the welding process. Certain metals used in welding may volatilize and give rise to irritation of the skin, but this is not usual. It could be expected that volatilization and condensation on the skin, or absorption through the lungs of substances either being welded or parts of the welding material might cause such trouble. The foreign literature makes more mention of such problems than the American, and those mentioned are not well founded in many instances.

Skin diseases are found in different forms. The diseased part of the skin may show only reddening, or papules and blisters as well. If the blood vessels in the deeper layers are attacked, the inflammation of the skin is accompanied by bleeding. Pain and itching may cause loss of sleep and consequently injure the nervous system. Frequently it is easy to treat the skin trouble, it heals quickly; but a repetition through the use of the material necessary for the work will produce a recurrence. Thus a rather long interval between recovery and resumed working may be the result.

It is known today that some skin troubles occur when a worker is allergic or sensitive to certain substances, such as chrome, nickel or zinc, etc. The sensitiveness of the skin may be caused by a single substance or by a group of materials. The tendency to be irritated is greater if a skin is transpiring.

It is well known that in welding work, protection from radiation from the arc is essential. This radiation is often a mixture of ultra-violet light, infra-red rays, and visible light. Exposed parts of the body, therefore, should be well protected, not only the eyes but also the skin. In sensitive persons the effect of radiation may enhance the sensitivity of the skin.

Tests may show whether a worker is particularly sensitive to a certain metal or other material, and for this purpose the patch test is frequently used. A small amount of the suspected material or an extract thereof upon a piece of blotting paper or lint is applied to a healthy part of the skin and held in place by a piece of adhesive.

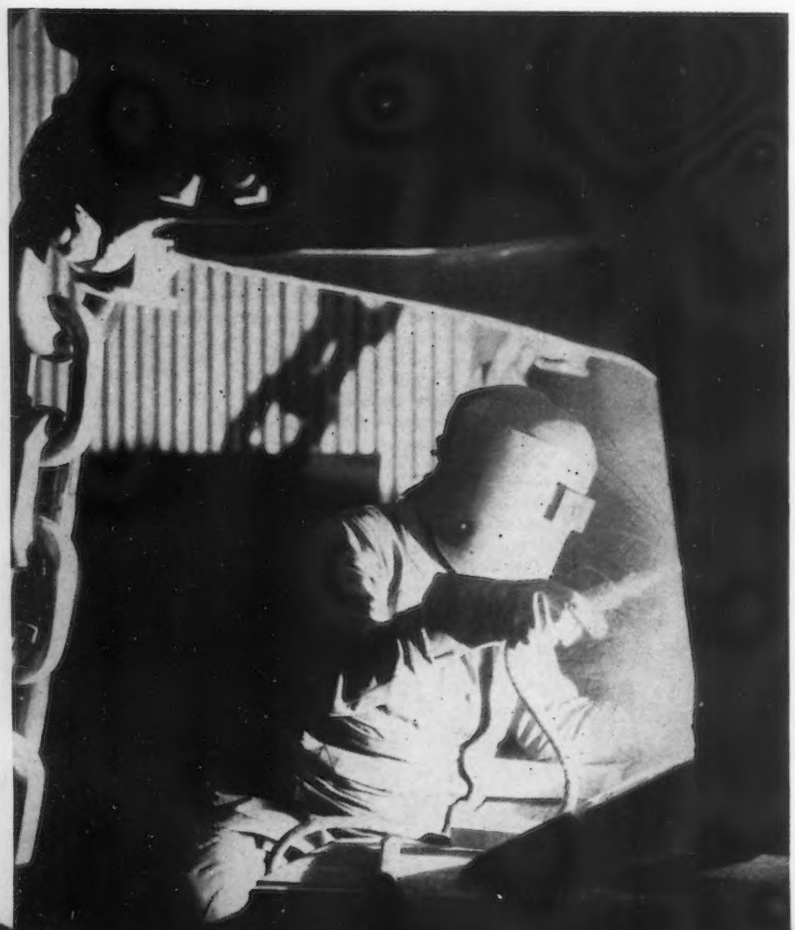
A reaction similar to the original skin irritation will be produced if the worker is actually sensitive to the material. The reaction of the skin may be either immediate or delayed. Immediate reaction develops within 5 to 10 min. after application and assumes the form of a wheal which may be itchy or burning. The delayed reaction may occur after some hours or even as late as two days after the beginning of the test.

This delayed reaction may assume the form of wheals or other signs of skin irritation such as reddening (erythema), swelling, itching, a burning sensation, or a general eruption like an urticaria.

Should it be desirable to know the exact ingredient within an alloy responsible for the skin irritation, a patch test may be carried out with every single constituent, for any single component may be the irritating material.

In most cases a strong improvement and perfect healing is accomplished as soon as the injurious substances have been removed. Sometimes, however, a special treatment of the skin trouble may prove necessary. It is important not to neglect any small sores or injuries of the skin. Many a long standing and weary skin disease could have been prevented by early suitable treatment of those small beginnings.

Cleanliness is an important factor in prevention of all industrial skin irritations. For washing, the workers must have adequate facilities, warm water, a mild soap, perhaps a little soda if necessary. The soap should not be unduly alkaline as this tends to soften the horny layers of the skin. When there is a specific hazard as in the use of certain metals, workers should be given definite training in the requisite precautions.



WELDER repairing a drag line bucket. Photo courtesy of Lincoln Electric Co.

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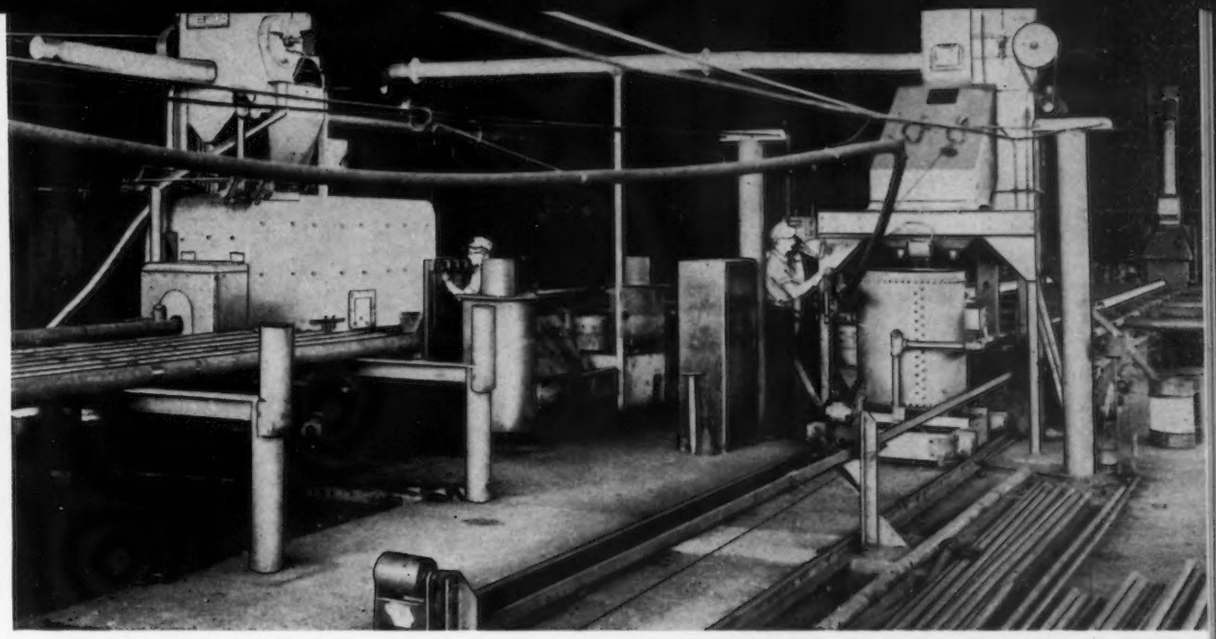


GENERAL view of the Wheelabrator cleaning units installed in the Spang-Chalfant division of the National Supply Co. At the left is the unit for cleaning the exterior of seamless steel pipe up to 14 in. diameter. At the near right is part of the shot recovery system and blast tank being recharged for cleaning the interior of pipe by lance (shown at end of travel). In the right background may be seen the hood for collecting dust and spent shot from far end of pipe.

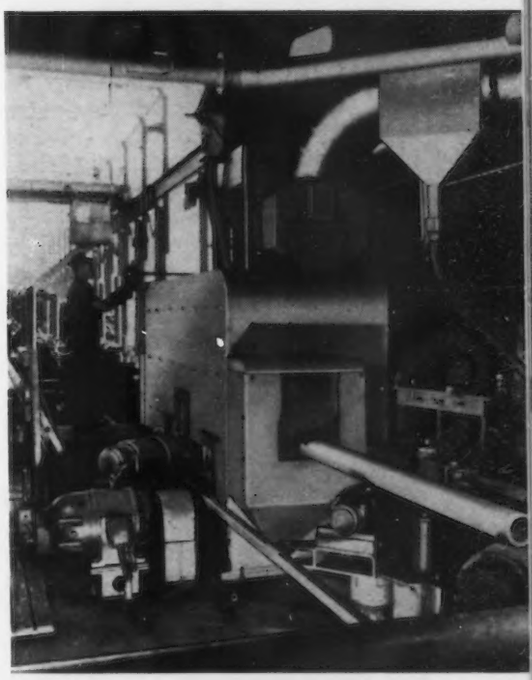
Cleaning Pipe by Shot Blasting

ONE of the vexing problems in the production of seamless steel pipe has been the removal of the heavy heat treat scale formed in the process. For many years pipe made by the Spang-Chalfant division of the National Supply Co., Ambridge, Pa., was cleaned by an outside concern, but inasmuch as this arrangement did not afford the proper control, the company decided to incorporate the cleaning operation with other pipe processes. A cleaning system built by American Foundry Equipment Co., Mishawaka, Ind., was especially designed for this application. It includes an airless Wheelabrator for cleaning interior of pipe ranging from 2 to 14 in. o.d. and from 18 to 50 ft. in length and an airblast for descaling the interior.

For cleaning the outside of the pipe two Wheelabrator blast units are used, mounted in the bottom of the cabinet so that they blast upward in direct line with the pipe which passes through the cabinet on a conveyor mechanism. With this arrangement, the distance between the blast units and the bottom of the pipe is the same for all sizes of pipe, thus assuring uniform cleaning. Pipe is fed through the cabinet by power driven rolls. Due to the different types and sizes of pipe and the amount of scale encountered, it is necessary to control the time any one unit of area of the pipe is held in the blast. This is effected by varying the angle of skew of the conveyor rolls and also their r.p.m.

After external cleaning, the pipe is automatically rolled off the conveyor onto skids preparatory to the internal cleaning step. For this operation a lance type nozzle long enough to blast the full length of the pipe is used. This nozzle is inserted into the end of the rotating pipe, which is supported on revolving steel disks. Both the speed at which the nozzle rotates and the power feed of the nozzle can be regulated to obtain the most effective cleaning.

The airblast tank, which controls the mixing of the air and steel grit, and the storage hoppers for abrasive are mounted on a steel car riding on a track. Hence, as the nozzle travels into the pipe, the whole blast mechanism is drawn forward by steel cables. Compressed air is supplied the unit by rubber hose suspended from messenger cable. During the cleaning cycle, the far end of the pipe fits into a metal housing which serves as a hood for air removal to a dust collector and a catch housing for spent abrasive. This abrasive is then returned by belt conveyor to the boot section of a bucket elevator for cleaning and recirculating in the blast equipment. This part of the unit is in a fixed position, and the blast tank is recharged at this point.

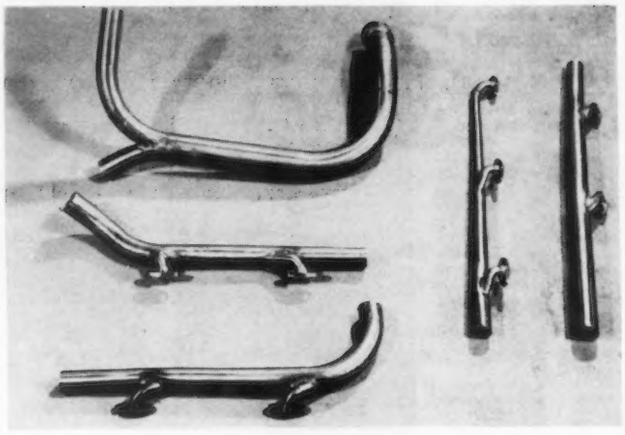


DISCHARGE side of the Wheelabrator unit for cleaning the outside diameter of seamless pipe. Two of the power driven skew rollers may be seen in the foreground. There are other sets of power driven conveyor rolls at the front of the unit.

After the interior of the pipe is cleaned, the nozzle is retracted, the pipe kicked off the disks to nearby skids, and a new length of pipe rolled into the cleaning position.

While it is difficult to give standard production figures as to cleaning speed, because of the variations in size of pipe encountered and the condition of scale, it can be stated that for 4½ in. standard low carbon pipe cleaning is being done at the rate of 18 ft. per min. for the exterior and 14 ft. per min. for the interior.

Fabricating Alloy Steel Tubing



THESE alloy steel parts required several combinations of fabricating operations.

THE choice of alloy steels for the coolant circulating system of a recently developed liquid-cooled aircraft engine combine the high resistance to corrosion and high strength of this type of steel for a difficult application. Preliminary designs indicated that it would be very economical to make the component parts of the system from welded 18-8 tubing. This tubing is made by a forming and welding process that converts a coiled 18-8 stainless steel strip of the desired wall thickness into the tubing form in a continuous mill operation.

The illustrations show that these typical parts of the assembly undergo a considerable variety of fabrication. Forming operations include bending, tapering, expanding, and flaring, and the tubing bends and bolting flanges for outlets and inlets are welded.

The welding and mechanical working properties of the material, as well as the metallurgical effects of the fabricating operations, had to be carefully determined before production was started. Consultation with a welded tubing manufacturer resulted in several advantageous changes in the first design, and the adoption of specifications favorable to economical and safe construction. Intricate parts like those illustrated have been made to meet very close tolerance requirements by careful examination of the maximum and minimum limits of the various items involved.

In several of the parts shown it is necessary to join machined bolting flanges to formed pieces of tube. If these are finish machined to final size before welding it is extremely difficult to control the welding technique so that the whole part will fit into its place in the assembly without further machining. It is much easier to make the welding assembly with semi-finished flanges and do the machining afterwards.

Engineers of Alloy Mfg. Co., Pittsburgh, were consulted on this fabrication problem, as a preliminary to preparing final specifications for the tube fabrication. A study of the plans showed several items which involved one bend in one plane interlocked with another bend in another plane without any tangent interval. As a forming and bending operation, this is impossible unless done with a drop die. However, by forming the desired bends in different pieces of tube and welding the bent tubes together, the desired shapes were produced with reasonable speed and cost, with the bends falling in the planes designated. This type of welding operation can usually be avoided by further redesign when volume production warrants it.

Each detail of the design was examined from the standpoint of the fabrication methods involved, and parts were produced that might otherwise have been classed as impractical with 18-8 material with a wall thickness of 0.032 in. Some of the small outlets were bent at a 5/8-in. radius, which is considerably below general practice.

It is apparent that the limitations on the fabrication of welded stainless steel tubing are no more severe than on other types of tubing, and scrap losses are minimized.

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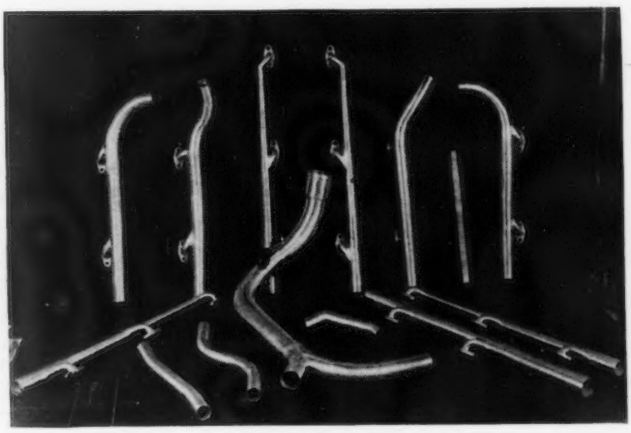


THIS is a group of typical component parts of an engine liquid-cooling system.

Brass Cleaned with Ferric Sulphate

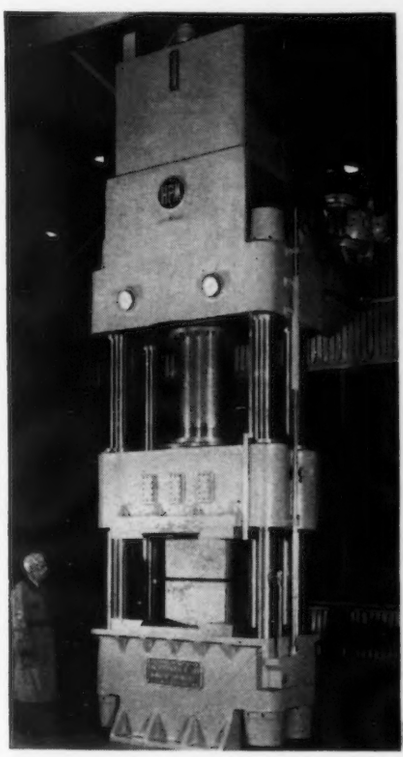
FERRIC sulphate has been found to do an exceptionally good job of removing black smut and red cuprous oxide scale from the surface of brass after it has been formed and stress relieved, according to Monsanto Chemical Co., Everett, Mass., which has commercially developed the process for making this chemical. The advantage of ferric sulphate over other chemicals previously used for this purpose is that it removes stains more quickly and with less loss of metal, thereby preserving the design on stamped parts like buttons. The same chemical can also be used to clean brass cartridge cases after annealing.

New Equipment . . .

Hydraulic Presses

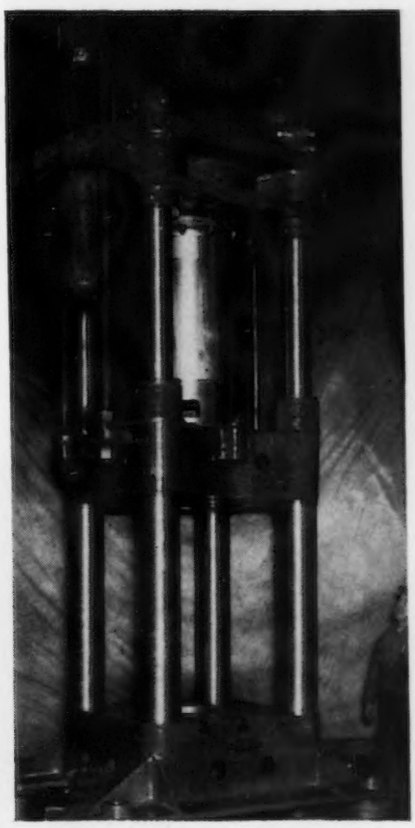
Here is a group of newly developed hydraulic presses for shell forging and gun barrel straightening; for bending, flanging, forging and general assembly work.

REPLACEMENT of packings including that of the press ram, is eliminated by a new design of hydraulic forging press, according to its manufacturer, the *Hydraulic Press Mfg. Co.*, Mt. Gilead, Ohio. The press uses a double-acting main ram and does not require auxiliary pull-back cylinders. It is operated by a closed circuit operating system powered by an HPM radial variable delivery pump, and controlled by a single hand lever. Down stroke of the ram is made by gravity, the oil entering the cylinder through a surge valve, and pressure build-up begins as soon as the platen meets the work. This permits close control for planishing operations.

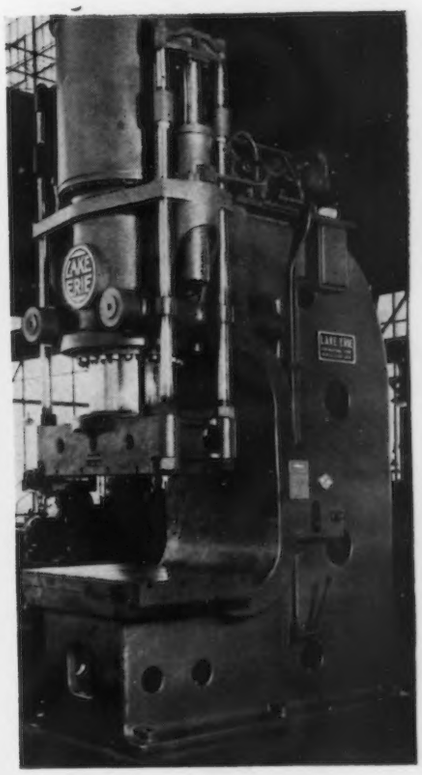


500-Ton Piercing Press

FOR the first operation in shell forging by the pierce and draw method, a 500-ton piercing press is



included in the standard line of *Baldwin Southwark Division, the Baldwin Locomotive Works*, Philadelphia. This unit has a 32-in. diameter main ram with a 42-in. stroke, and a working pressure of 1500 lb. per sq. in. The daylight is 99 in., and overall height is approximately 25 ft. A 12-in. diameter stripper cylinder is incorporated in the bottom platen. With the accessory equipment furnished it is designed to make 240 strokes per hr.

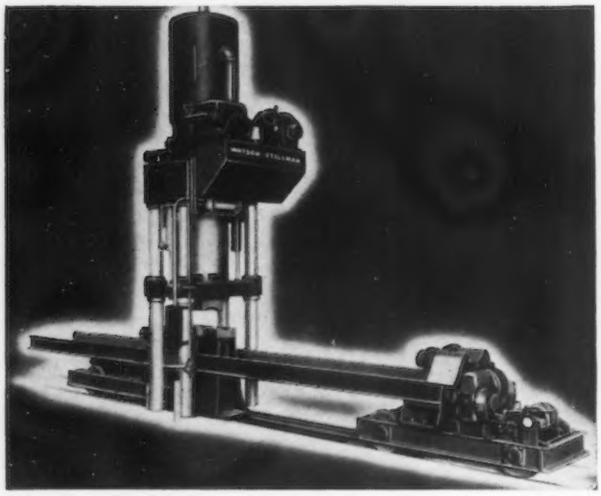


400-Ton Bending Press

ANNOUNCEMENT of a 400-ton hydraulic plate bending press especially adapted for shipyard use is made by *Lake Erie Engineering Corp.*, Buffalo. It is a self-contained unit with a cast steel frame. Daylight opening is 36 in., stroke 24 in. and throat 30 in. Control is through a manual lever operating on the pumping unit mounted atop the press.

Shaft Straightening Press

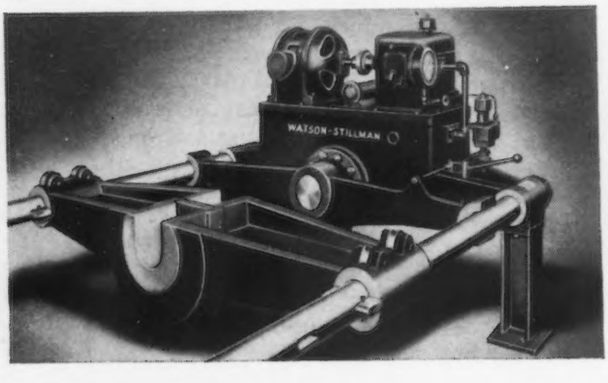
A STRAIGHTENING press of 1000-ton capacity has recently been completed by *Watson-Stillman Co.*, Roselle, N. J. It is



used to straighten shafts from 12 to 18 in. in diameter and from 7 to 60 ft. long. One man operates it from a central control panel. Two sets of rollers, each mounted on a hydraulic lifting ram are used to handle and position the work, and one set of rollers is motor driven to rotate the work. Advance and return speed is 470 in. per min., pressing speed is 15½ in. per min. Stroke is 48 in. It is powered by a 50-hp. motor driving a rotary piston type pump.

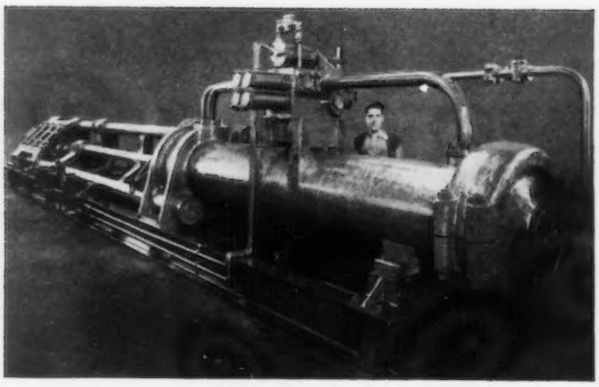
Forcing Press

A SELF-CONTAINED forcing press, operated by a 10-hp. motor coupled to a variable delivery radial piston pump, has recently been designed and built by the *Watson-Stillman Co.*, Roselle, N. J. It is of the horizontal type with 72 in. between bars. The opening is adjustable from 2 to 10 ft.; stroke is 18 in.; and the shaft-holding gap on the rear abutment is adjustable for shafts up to 6 in. in diameter. Advance speed is 200 in. per min., pressing speed is adjustable to 25 in. per min. and return speed is 400 in. per min. Designed primarily for forcing shafts into rotors, it can be used for any similar operation.



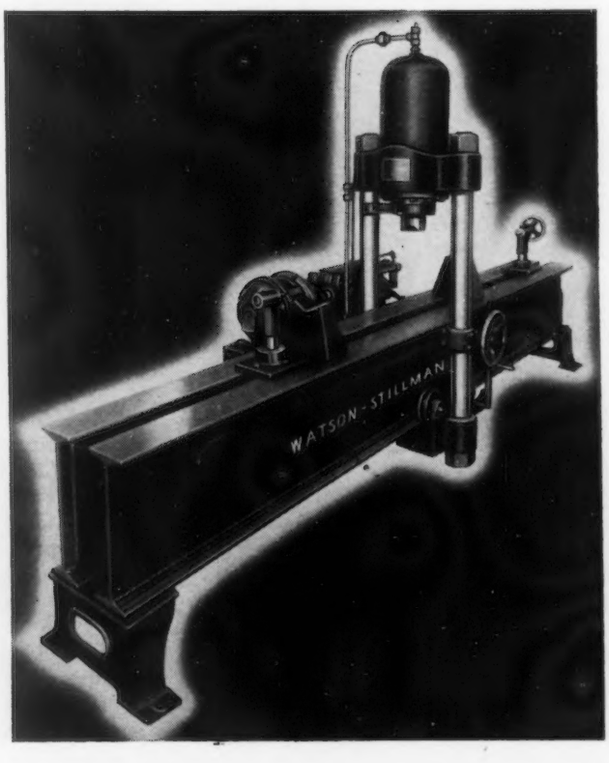
Gun Barrel Straightener

AN improved 125-ton press, embodying sensitive, single hand lever control, has been developed for gun barrel straightening by the *Watson-Stillman Co.*, Roselle, N. J. The press is also suitable for straightening shafting and forgings. A handwheel controls movement of the press along the table which is 14 ft. long and 17 in. wide, and equipped with bending blocks, casters and rollers. The same company has also built two improved types of straightening presses of 50-ton capacity, one for straightening rods, tubes and structurals, and the other for truing small bore gun barrels. The outstanding feature of the latter is the incorporation of a positive stop adjustment controlled by a handwheel. Both presses have self-contained pumping units, are controlled by hand levers.



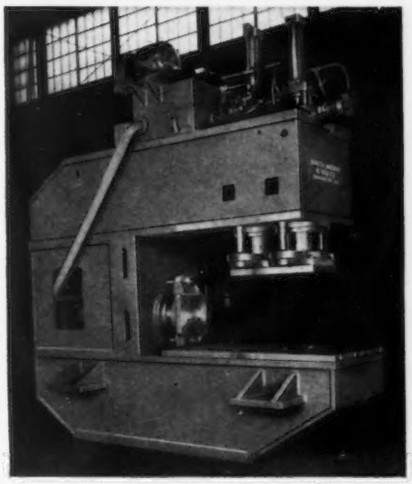
Horizontal Draw Bench

SEVERAL improvements have been effected in the 200-ton hydraulic draw press built by *Baldwin Southwark Division, the Baldwin Locomotive Works.* Among the new features of this 155-mm. shell drawing unit are a quick acting operating valve and a one-piece cast bed for the draw rings. The extreme end of the piston which carries the drawing mandrel is mounted on a crosshead which rides on adjustable shoes on the columns. The 19 x 14-in. double acting piston has an 11 ft. stroke. Floor space is 45 x 6 ft. Four ring-type draw rings and a stripper are used for 155 mm. shell. The press is designed for accumulator operation at a pressure of 1500 lb. per sq. in.



400-Ton Flanging Press

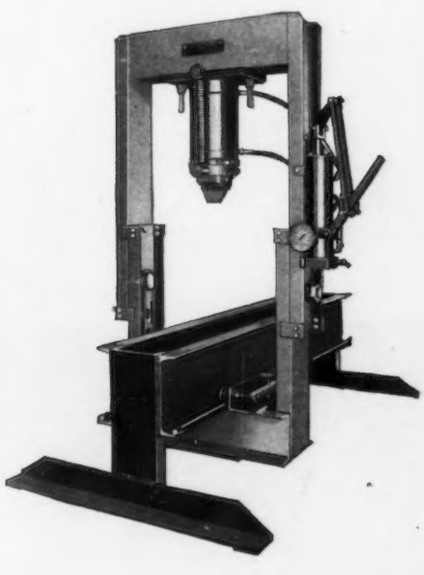
CAPACITIES up to 400 tons are obtainable on a hydraulic flanging and forming press recently introduced by *Beatty Machine & Mfg. Co.*, Hammond, Ind. The hydraulic oil circuit is so arranged that the two vertical cylinders, each of 200-ton capacity, can be tied together and operated as a 400-ton unit by a single control lever. A horizontal flanging cylinder is incorporated in the housing. In this operation the front ram advances at the rate of 290 in. per min. and holds the work while the horizontal ram presses at 21 in.



per min. An unusual feature is a self-cooling hydraulic oil system which obviates the need for cooling coils.

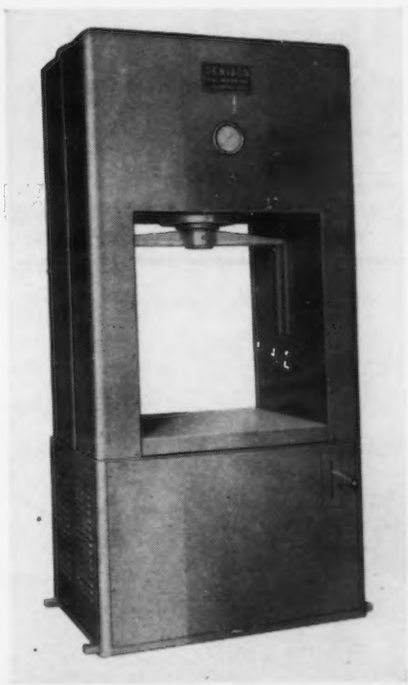
125-Ton Hydraulic Press

A NEW 125-ton, industrial hydraulic press has been announced by the *Bee-Line Co.*, Davenport, Iowa. The press is mounted on a movable roller bearing carriage, permitting application of pressure at any point on the 84 x 34 in. bed. The jack carriage can be raised or lowered 16 in. with a minimum space of 2 in. between the ram and bed and a maximum space of 28 in. The ram travel is 10 in. The jack has a three speed, hand operated pressure pump, and the overall size of the tool is 8 ft. x 4 ft. 8 in.



Light-Duty Hydraulic Press

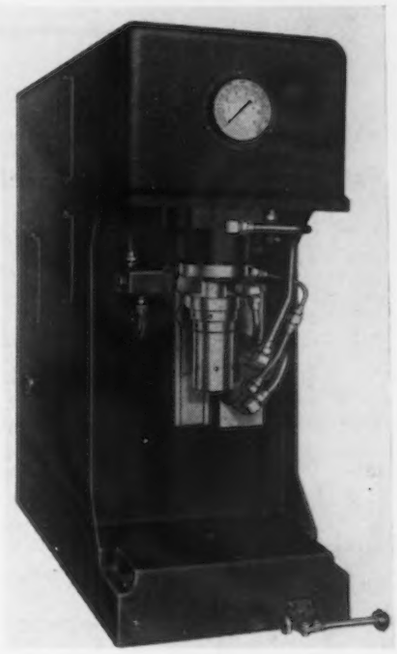
SELF-CONTAINED presses in capacities of 50 tons and up are now offered by *Dennison Engineering Co.*, Columbus, Ohio. This type of press has a single operating valve which is moved down for rapid advance, while further movement of the valve lever applies high pressure to the work. Valves are arranged so as to control, within reasonable limits, the tonnage applied to the work. The unit may



also be equipped for semi-automatic operation by the use of electrical push buttons. The press ram is threaded internally for attachment of bending, assembling or straightening tools.

Small Hydraulic Press

AVAILABLE in 1, 3 and 5-ton capacities, a new bench type press built by *Dorr-Patterson Engineering Co.*, Detroit, is obtainable with either of two types of controls. One is a single lever-operated valve, the other employs a pilot-operated valve. The press platen is 12 in. deep and 16 in. wide, and strokes are 6, 8, or 12 in.



Approach speed is 200 in. per min., return is at the rate of 400 in. per min. The hydraulic medium is oil, delivered by constant delivery vane type pumps.

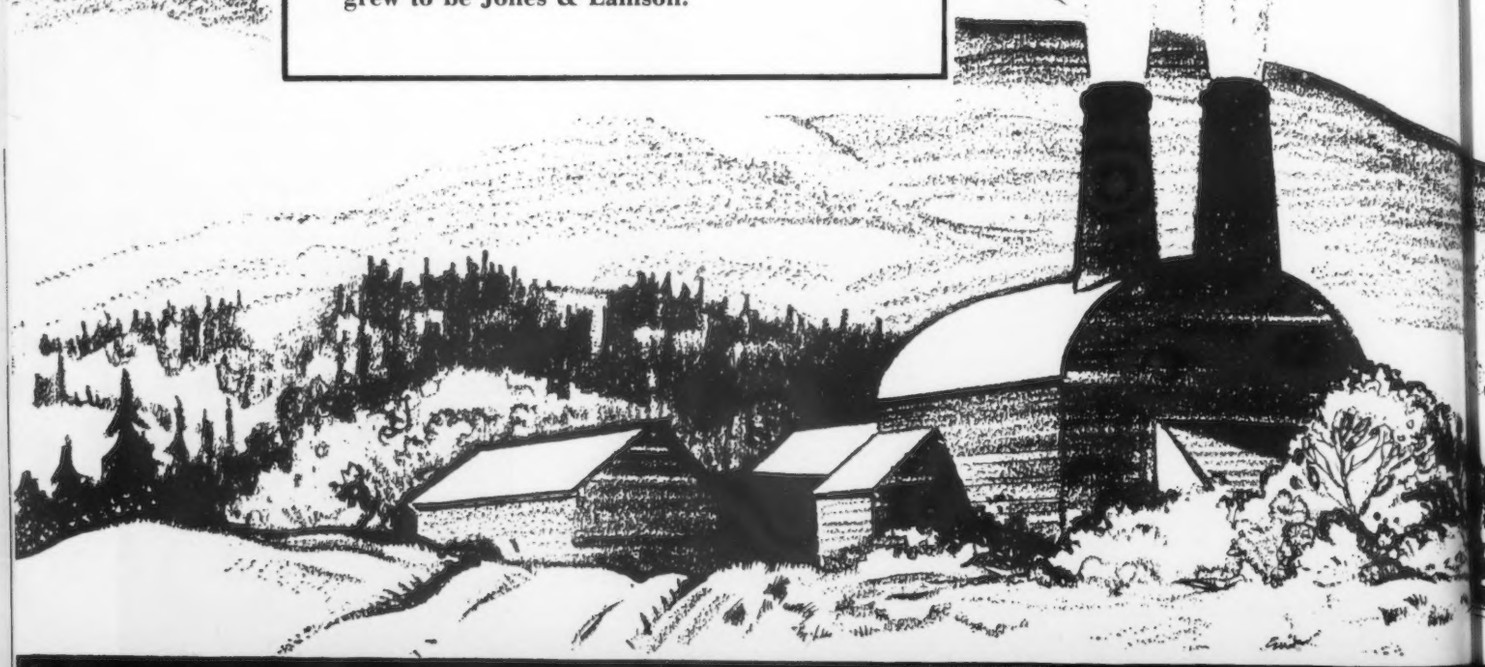
Pipe Bending Press

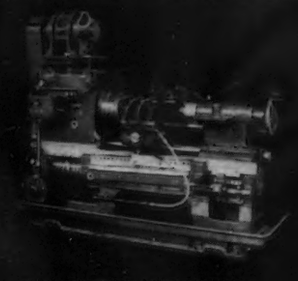
MOST bends can be made cold on an improved 200-ton pipe bending press just brought out by *Baldwin Southwark Division, the Baldwin Locomotive Works*, Philadelphia. The ability to bend most pipe cold not only saves the time

required to heat the pipe but also eliminates distortion due to cooling. The unit is self-contained and controlled by a single hand lever.

Isaac Tyson

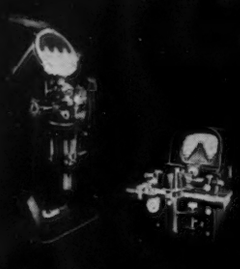
It was Isaac Tyson, the Quaker, who first discovered the richness of the iron ore deposits "lying along the base of the Green Mountains." But long before his first smelter was "blown in" in 1837 the mechanical ingenuity and skill of the early artisans of Vermont were widely recognized. Iron was in their blood, and served them as marble served the Greeks or gold served the Incas . . . they understood it and respected it, even loved it. First among Tyson's important customers and first to convert his Green Mountain iron into machinery and firearms was the company that grew to be Jones & Lamson.





FAY AUTOMATIC LATHES

AUTOMATIC THREAD GRINDERS



OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

had IRON in his Blood

IT'S seventy years now since Tyson's furnace last smelted Green Mountain ore and metallurgy has progressed from an intuitive craft to an exact and intricate science.

Now Jones & Lamson reaches out to many sources of greater capacity and variety and uses many formulas where each will serve the best. But iron, the basic material of industry, is still in the blood of our people here and, in spite of all the knowledge that science has given us we still value the father-to-son inheritance of the craftsman's sense of material.

True the Jones & Lamson tradition dates to Isaac Tyson . . . and before, but our leadership in metallurgy, in design, in machine tool building dates far ahead, anticipating your needs today and preparing for post-war problems that can be seen only dimly.

Your inquiry, whether your company is large or small, will receive the careful, detailed study of our engineers. Send your questions to us today and ask for our illustrated catalogs.

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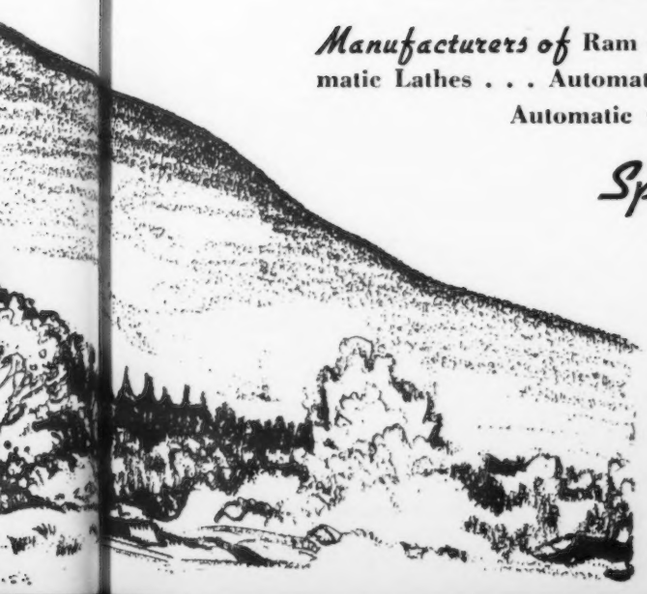


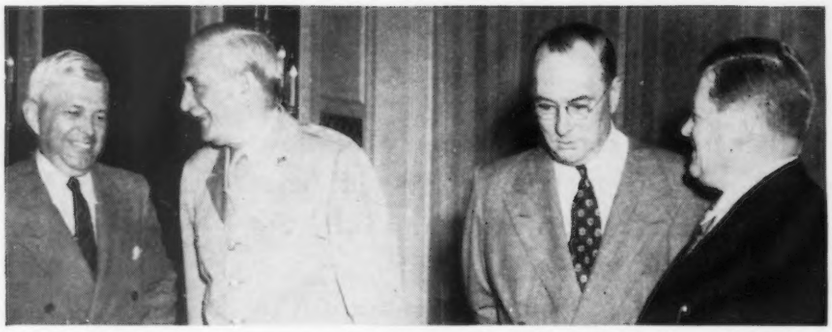
PROFIT PRODUCING
MACHINE TOOLS

SADDLE TYPE
UNIVERSAL TURRET LATHE

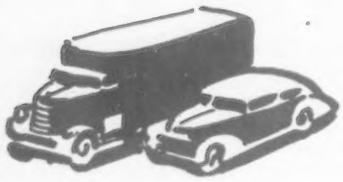
RAM TYPE
UNIVERSAL TURRET LATHE

Assembly Line . . .

• New Fisher Tank Arsenal in Production . . . Tool reclamation practices improved . . . Reuther predicts closed plants.



MEETING WITH NELSON: Presidents of General Motors and Chrysler Corp. and a past president of General Motors Corp. were photographed together at the annual meeting of the Automotive Council for War Production last week. Shown (left to right) are C. E. Wilson, president of General Motors and a director of the Council; Lt. General William S. Knudsen, former president of General Motors; Donald M. Nelson, WPB chief; and K. T. Keller, president of Chrysler Corp. and a director of the Council.



DETROIT—Passing of another milestone in the development of Detroit's war effort was celebrated last week with the announcement that the new tank arsenal built by Fisher Body Division of General Motors had been completed and was in operation.

This new plant, with its trio of assembly lines, is devoted entirely to turning out the welded version of the M4 medium tank. This model, which has apparently already been fire-tested in North Africa, embodies a number of external improvements over the earlier models. Noteworthy in this respect is the lower silhouette and the rounded contours. In addition, it carries a full length 75 mm. cannon in a top turret capable of revolving through 360 deg., in place of the limited field of effectiveness of the stubby 75 mounted in a bulb on the forward right-hand side of the M3 model.

The first pilot model of the Fisher tank was turned out in only 47 days after the contract was awarded, according to E. F. Fisher, plant manager. The contract for the tank plant was signed in January, with the first tank not scheduled to be built until the plant was completed. However, Fisher engineers immediately applied themselves to the job, taking up quarters in another Fisher plant pending completion of the new tank plant.

Fixtures and tools for the new model were designed and built in these temporary quarters. The tank itself was redesigned for welded construction and the first unit was turned out 47 days later.

To supply machine tools needed for the new plant, Fisher itself built a number of vertical boring mills and now, after having filled the requirements of the tank plant, is also producing boring mills for other companies.

A key factor in the production which Fisher has been able to obtain is the wide use of welding fixtures which permit down welding on practically every welding job on the tank. What is believed to be the largest fixture ever built for tank welding is located at this plant. This fixture weighs as much as a tank. It is a universal type, revolving in a complete circle and capable of being tilted along its axis. Some armor plate welding jobs at this plant are being done at speeds as high as 32 in. a min.

THE added emphasis placed on tool salvage as new tool deliveries are still counted in terms of months, have created interest in two reclamation plans which are being utilized here. These plans permit the reclamation of broken cutters, bits, reamers, etc., by welding and the re-sizing of worn reamers by a forging process.

Broken tools are salvaged by welding with a special electrode, holding the tool at about 750 deg. F. for approximately 10 min. in a mercury bath, followed by air cooling and machining to size. Lost parts of such broken tools can be built up with this special weld metal. Observers report that tools rebuilt by this method are just as serviceable as new ones. The prime advantage of this process, however, is its speed, for tools can be repaired in a matter of hours.

The re-sizing of reamer bits involves heating the undersized bits to forging temperature and inserting in a special die. This die, gripping the entire reamer, forces metal from the shaft out into the flutes, turning out the flutes from 0.020 to 0.030 in. oversize. Reamers reclaimed in this manner are said to give as good service as new reamers.

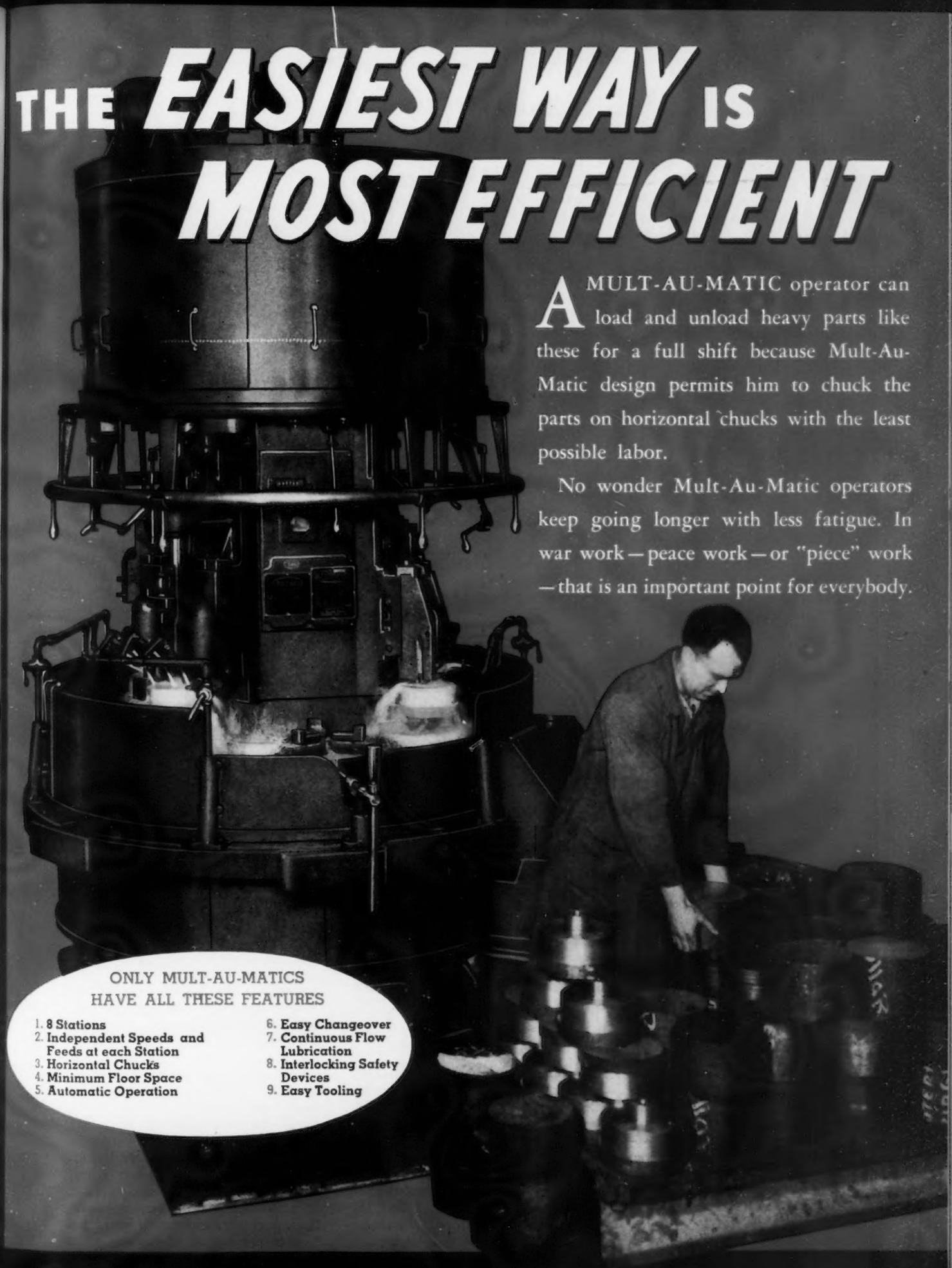
The success of this reamer reclaiming process has been such that negotiations are now pending which will, if consummated, double the present productive capacity of the plant. At present the company owning this process holds standing orders with several large plants to refinish all worn and undersized reamers. While the limit of the maximum size of tools that can be reclaimed by this method is practically unlimited, the minimum size that can be handled is around $\frac{3}{8}$ in. Under this size, heating of the dies themselves is required to prevent too rapid cooling of the tools being handled.

Another little publicized source of valuable aid to the war effort, which only lately has been accorded its proper recognition, is the ingenuity of the man in the shop. Most plants in this area now have, or are establishing, organizations setup to encourage and study suggestions on means of increasing

THE EASIEST WAY IS MOST EFFICIENT

A MULT-AU-MATIC operator can load and unload heavy parts like these for a full shift because Mult-Au-Matic design permits him to chuck the parts on horizontal chucks with the least possible labor.

No wonder Mult-Au-Matic operators keep going longer with less fatigue. In war work—peace work—or "piece" work—that is an important point for everybody.



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HAVE ALL THESE FEATURES

1. 8 Stations
2. Independent Speeds and Feeds at each Station
3. Horizontal Chucks
4. Minimum Floor Space
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production or improving quality offered by employees. Usually some form of a reward, as cash or war stamps, is awarded for accepted ideas and numerous instances are cited of the value of suggestions brought out by such plans, capitalizing on the gadget-making inclination of the average American.

As a specific instance, an employee of the Murray Corp. recommended mechanization of a job that was then being done by hand. Adopting the suggestion resulted in cutting down production time by 90 per cent. This operation involved removing scratches and imperfections from aluminum sheets. The employee suggested a tool which could be used in an electric drill.

At a General-Motors plant, an employee's suggestion for a new type of milling fixture enabled an operator to mill 40 parts at one loading instead of the previous two parts. This made possible an increase in production on this part of some 51 per cent.

Experience in several plants have indicated that up to 50 per cent of the suggestions made by employees have merit and may be applied. Awards for such accepted suggestions are often based on the savings in materials or time over a set period of two or three months.

HIGHLIGHTING some of the problems faced by war plant management in keeping a plant running, is the effort of Ford Motor Co. to obtain permission from WPB to convert its tire plant at the Rouge into a tire retreading plant for its employees.

Charles E. Sorensen, Ford vice-president, in making the proposal, pointed out that the company's Willow Run bomber plant was laid out with the expectation that workers could travel back and forth by automobile. "If our transportation is not handled successfully, everything becomes a failure," Sorensen told WPB.

The same statement can be made of most of the new war plants here, as well as the bulk of the converted plants. And judging from the crowded condition of surface transportation lines now, a total lack of tires with which to drive to work would be an almost paralyzing blow to Detroit's war industries.

Ford's proposal involves the use of Dow Chemical's Thiokol as the recapping material, which would require no crude rubber. Sorensen pointed out that if the company was given control over the tire use of its employees, it would set up a plan for economical rationing of recapped tires and could regulate the number of people that would ride in each car.

Whatever cheer war production officials might have gleaned from the news of the operation of the new Fisher tank plant, must have been dampened somewhat by the dire prediction of Walter Reuther, director of the G-M section of the UAW-CIO, that the failure of steel and other raw materials to reach defense plants would cause shutdowns and costly delays in war production and wide spread unemployment.

Reuther, in a letter to Donald M. Nelson, WPB chief, said that four G-M plants in Michigan were already closed for lack of steel and that "tank plants" here may also be forced to close soon for the same reason.

CIO spokesmen amplified Reuther's letter by saying that they believed that at least 70 plants would be down soon for lack of steel, but would not identify the plants. These spokesmen added that since Reuther's letter, WPB had been reallocating material to this area, reducing somewhat the imminency of the crisis.

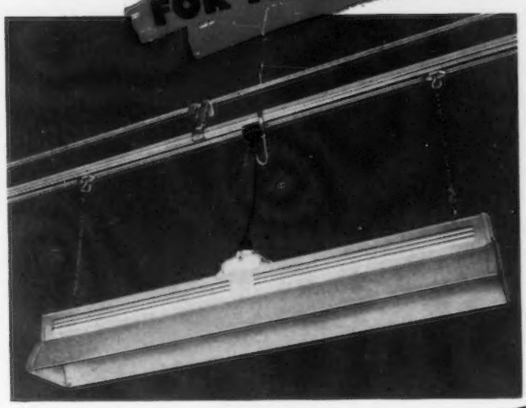
WPB officials, questioned on this reallocation, said they were unaware of such steps.

Reuther charged in the letter that a part of the steel shortage could be traced to the Army, Navy and Air Corps needlessly using 2,500,000 tons of steel a year for temporary barracks and warehouses." The UAW director told Nelson that he believed that the impending shutdowns were not necessary and that a more properly coordinated allocation of steel would make possible a continuance of full operations. Reuther said that the armed services could make use of lumber in their construction projects.

Among the recommendations Reuther offered to Nelson were: Immediate and complete revision of priorities and materials allocation; a greater amount of coordination in production of various parts of war equipment, and closer cooperation with the union.

NEW LAND BATTLESHIP: This mighty M-4 tank has many constructional land fighting advantages over the M-3. The M-4 has a strong welded hull and increased fire power.

4500 MAN HOURS SAVED



A run of Universal Trol-E-Duct hung from messenger cable, and a typical industrial fluorescent fixture suspended from the Trol-E-Duct itself by weight supports. Current is supplied through the Receptacle Twist-out Plug in which a fusible attachment plug is inserted for individual protection of fixture.

BullDog's simple, flexible, pre-fabricated design made an important three-way saving . . . *of time, money and materials* . . . in this great new aircraft flight service hangar, the largest of its kind in the country.

For light distribution, the contract originally called for an old-fashioned wiring system . . . *but when BullDog advantages were pointed out* the specifications were changed, and Universal Trol-E-Duct was substituted. Twelve 800-foot runs were used, feeding and supporting 1152 mercury rectified fluorescent fixtures.

The result: Installation time was 4500 man hours less than the estimated labor for the out-moded system. And in addition, large quantities of critical auxiliary materials which would have been used in the old-type system were saved.

Needless to say, buyer and contractor are now sold to the hilt on Universal Trol-E-Duct. Today this aircraft manufacturer has over twelve miles of Trol-E-Duct installed throughout various plants.

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Use Your Local BullDog Field Engineer

If you would like the many advantages of BullDog Universal Trol-E-Duct *for completely flexible "plug-in" lighting,* you should take advantage of the services of the nearest BullDog Field Engineer.

These men, conveniently located in all principal cities, are thoroughly competent to co-operate with architect, contractor or engineer in drawing up and submitting complete detailed layouts and specifications.

MANUFACTURERS OF Vacu-Break Safety Switches, SafToFuse Panelboards, Circuit Master Breakers, Switchboards, Bus Duct Systems—FOR LIGHT AND POWER

Washington . . .

• Quota system, superimposed on new priority changes, will cause a great deal of confusion . . . Scheme in mind is modeled after plan developed by British, whose conditions are different.

Harris and Ewing Photos

HIGGINS BEFORE HOUSE COMMITTEE: After a closed session July 23, during which they heard testimony from Andrew J. Higgins, president of the Higgins Corp., New Orleans, La., two House Merchant Marine Subcommittees authorized introduction of a resolution instructing the Maritime Commission to stay execution, for the time being of its order cancelling contracts for 200 Liberty Ships. Left to right: A. B. Landa, counsel for Higgins; Frank Higgins, a son; and Andrew J. Higgins.

WASHINGTON — Experimentation with steel distribution under the quota system is under way. How well it will work remains to be seen. Its application will be extended to the entire industry, alphabetically by companies, as quickly as feasible.

The steel distribution committee which will assign quotas is composed of Joseph L. Block, executive vice-president in charge of sales, Inland Steel Co., chairman; Jesse Honeycutt, assistant sales vice-president, Bethlehem Steel Co.; A. V. Wiebel, assistant to the vice-president in charge of engineering, United States Steel Corp.; David F. Austin, sales vice-president, Carnegie-Illinois Steel Corp., Norman W. Foy, general sales manager, Republic Steel Corp., and Charles Halcomb, district manager, Procter & Gamble.

The 57 products subject to quota assignment are as follows:

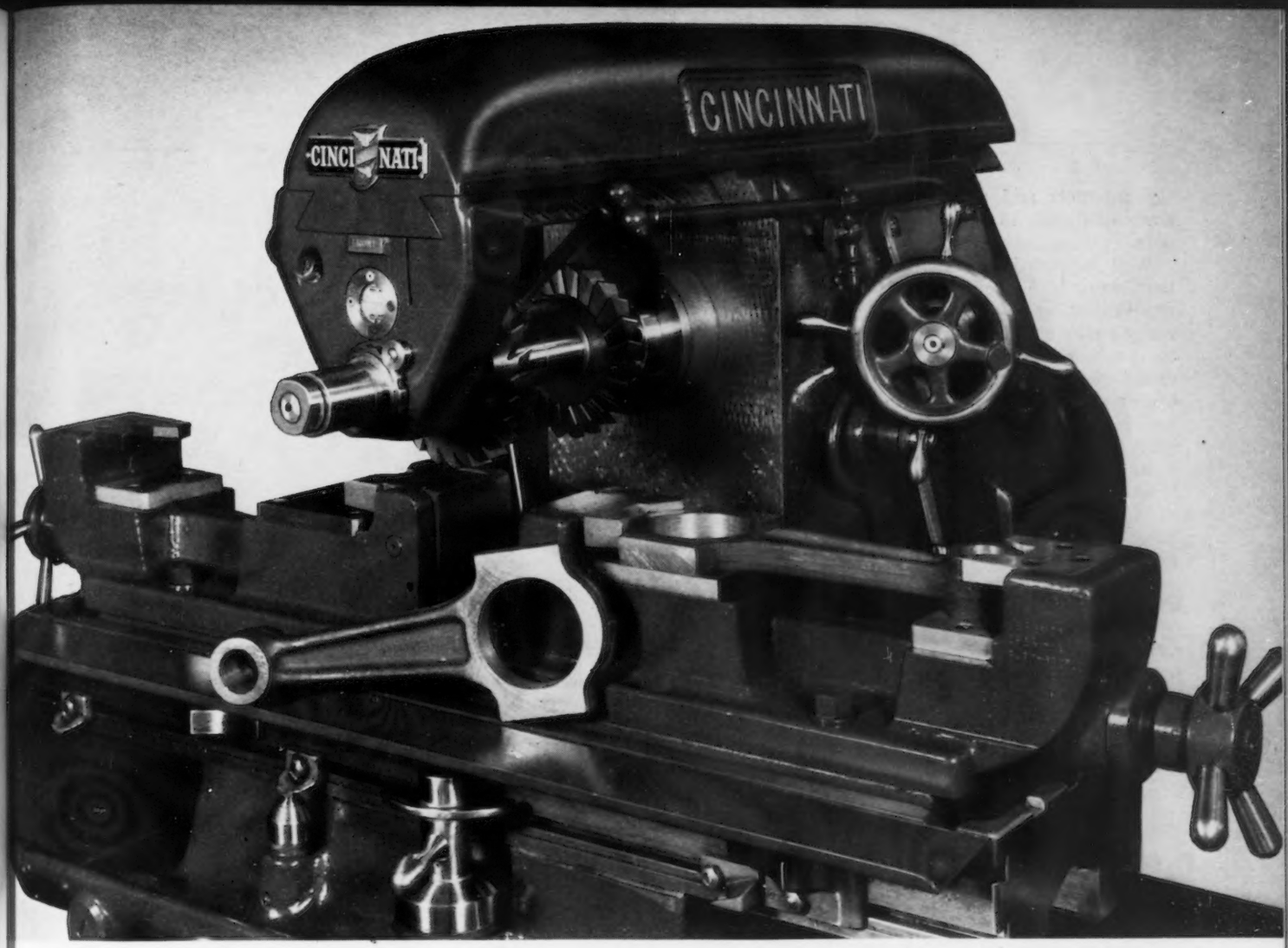
Pig iron; malleable and semi-steel castings; wrought bars; wrought, cast and other pipe and tube; purchased and home iron and steel scrap; carbon steel; ingots, blooms, billets, except shell steel; slabs, sheets, bars, tin bars; billet shell steel; tube rounds; structural shapes and piling; sheared, universal and strip mill plates, including skelp in plate sizes; skelp (except in plate sizes); rails, tie plates and track accessories; hot rolled, concrete reinforcing and cold finished steel bars; tool steel bars, including high speed steel; pipe, all kinds; wrought, drawn, barbed, twisted and woven wire; nails, staples, bale ties, rope and strand; other wire products, including fence posts and gates; tin mill black plate; hot dip and electrolytic tinplate; terne plate; hot rolled, cold rolled and galvanized sheets; hot and cold rolled strip; wheels and axles; forging, press and open hammer, drop and underset; steel rolls and all other castings; other steel mill products, carbon specified.

THE scheme in mind is built on the British plan. In Britain it is reported to be working satisfactorily. This being so, WPB sees no reason why it will not operate in the United States just as well. Yet there are differences that may or may not have a bearing on application of the plan. The American industry is vastly larger than the British industry, about six times greater. It is spread over a much greater territory in different climates and there are both long and short hauls of raw materials, the great bulk of which is of domestic origin. Outgoing shipments of rolled products also move both short and long distances and in these days enormous tonnages move abroad in convoyed ships. Produced from these shipments are huge quantities of badly needed scrap that does not find its way back to the American furnaces.

Whether these conditions, with their wide variance from those which confront the British industry, mean that a quota system might work well for the latter while not entirely satisfactorily for the American industry may be questioned.

This plan is based on the availability of steel, and is adaptable to either scheduling or allocation within the quota limits. The problem then is to divide or allocate the tonnage by products for the Army, Navy, Maritime Commission, Lend-Lease and essential civilian demands. The WPB gives directives to the mill, telling each what tonnage and the amount to roll for each of these sources. Placements are to be made according to what is considered the importance of the requirements. Under this plan it is hoped to achieve what is called "product balance" and at the same time supply the greatest possible tonnage of each product, and avoid conflict between units on any product. This plan in effect contemplates a broad amplification and refinement of the present allocation.

HOWEVER well the quota system turns out, it is bound to cause a great deal of confusion when it is superimposed on the new priorities changes made recently. Priorities Regulation No. 11 which directs that duplicated rated orders in the hand of producers be canceled by those who placed them, is a case in point. It is possible that it will be decided to remove the rolling of black plate or some other highly competitive product from the mill of one company to that of another in the interests of balanc-



TWO FIXTURES ON THE MACHINE GIVE IT *Two-fisted* PRODUCTIVE CAPACITY

● CINCINNATI No. 1-18 Plain Automatic Milling Machine. Equipment includes Automatic Spindle Stop and Automatic Backlash Eliminator. Circular No. M-848.

By the simple expedient of adding another fixture, production obtained from milling machines can often be increased a worthwhile amount. Knowing the cutting time (X) and loading and unloading time (Y) the desirability of an additional fixture can readily be determined . . . the greatest production increase will be realized in those cases where X and Y are approximately equal.

The illustration above shows how this idea has been applied to a CINCINNATI *No. 1-18 Plain Automatic Milling Machine. It is equipped with two fixtures for milling the sides of bosses on connecting rods. The cutting time happens to be longer than the loading and unloading time, but more important,* ***the machine is cutting continuously, and production is at a maximum.***

Like many other CINCINNATI Milling Machines the No. 1-18 Plain Automatics are well adapted to two-fixture milling. The circular for these machines, No. M-848 brings out the possibilities for this type of work in your shop.

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TOOL ROOM AND MANUFACTURING MILLING MACHINES . . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

ing products and using the most adaptable mills to particular products.

Well informed sources here say that there is no doubt that if the practice of shifting customers of many years' standing from one mill to another becomes widespread, dissatisfaction would result. It has been suggested that the quota system in this way would very likely lead to complaints of discrimination, no matter how hard WPB tried to be impartial. But things of this sort are mere incidents in time of war and must be disregarded.

Even if the Iron and Steel Branch achieves the complete equity in establishing quotas, it could be very well argued that customers lost during the war might be lost forever. And for this reason, there is speculation whether steel companies will receive the proposal favorably.

International News Photo

TEACHING A RED AIRMAN THE TRICKS: In the Middle East planes piloted by U. S. ferry pilots are arriving daily. Russian pilots are then shown how to fly them. Here we see a Russian pilot (left) in the co-pilot seat of a newly arrived American medium bomber. At the right is Lieut. Bill Stewart, U. S. Army pilot.

A COPY of each mill directive will be assigned to individual product units within the Iron and Steel Branch, so that when metal is parceled out, WPB officials can be reasonably assured that the plant designated will be able to roll the material ordered. Previously, this question was answered by long distance telephone calls to the mills to discover the condition of rolling schedules with the result that cursory checks of schedules proved at times inaccurate. The manufacturer would leave WPB with assurance that he would get his steel, only to be told later by the company selected that a mistake had been made and his material would be ready in four months instead of two.

Product unbalance is exemplified by present de-emphasis by top WPB material men on plate production. It is being said now that excessive plate production is dislocating other products. It is also now being argued that perhaps the industry is producing plates at the cost of structural tonnages. But politicians have insisted that the supply of plates has been and always will be short, by way of smearing the steel companies. They point to the shut-down of the Higgins Shipbuilding Co. and its contract cancellation as evidence of steel shortage. Strangely enough, some WPB officials have been taken in by the shortage tirade, and have urged greater plate production and have approved plate expansion, with five mills coming in by 1944, and insist that existing rolling capacity is not adequate to meet present plate demands. So it may be that the same old politico-industrial demagoguery which beclouded war steel production before the quota system was established will still be capable of making itself felt.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

OLD RUBBER AND OLD MACHINISTS ARE NOT THE ONLY THINGS THIS WAR IS BRINGING OUT! IT'S BROUGHT OUT WHAT AN EASY MARK I'VE BEEN FOR YEARS! TOO TIRED TO MOW TH' LAWN-- TOO TIRED TO BEAT RUGS-- TOO TIRED TO DO ANYTHING, AND HERE'S A SLIP OF A GIRL GETS THE SAME WORK IN THE SHOPS AND COMES HOME WHISTLING AND SINGING!
OH, BALONEY! THEY GIVE THEM THE SNAP JOBS!
WELL, DO WE HAVE TO GET OUR OWN SUPPER, NOW THAT YOU KNOW WE DON'T DO ANYTHING ALL DAY?
7-31
J.R.WILLIAMS
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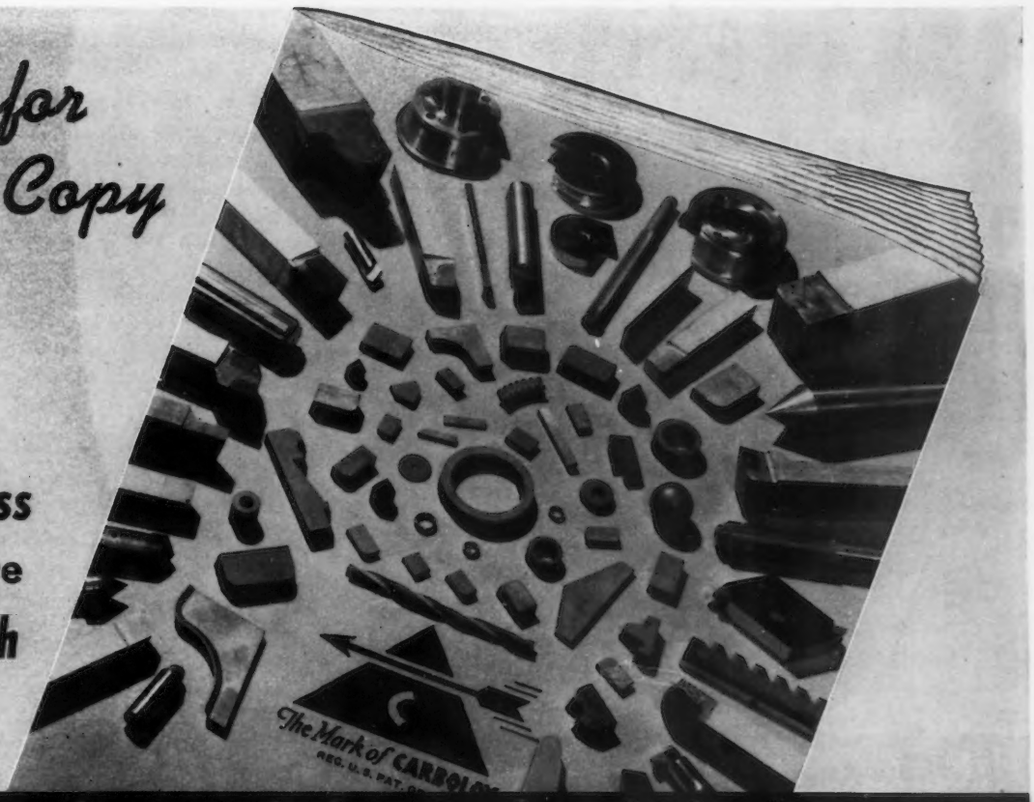

Off the Press on or before August 15th

New, Complete Carboloy Tool and Blank Catalog

We announce the release—on August 15th—of a special catalog, containing—under one cover—a complete listing of specifications and prices of Carboloy standardized tools and blanks available for war production. Designed to provide a quick, ready reference for those selecting tools for war work, this new catalog lists a wide range of products available in stock for prompt deliveries. As a special supplementary feature, the designs of a number of special types of tools commonly used have been standardized. Specifications and prices of these are included—eliminating delays for quotations, blueprints, etc. Also contains suggestions for saving time and money on your made-to-order tool requirements.

Reserve your free copy today, you'll find it to be a handy, time-saving guide.

Important Listings

Standard Tools (Incl. new sizes to be stocked)	(Stocked)
Standard Blanks (Incl. new sizes and styles to be stocked)	(Stocked)
Standard Boring Tools	(To be stocked)
Diamond-Impreg. Wheel Dressers	(Stocked)
Diamond-Impreg. Grinding Cones	(Stocked)
Masonry Drills	(Stocked)
Carboloy Guide Rings	(Stocked)
Carboloy Brinell Balls	(Stocked)
Lathe and Grinder Center Tips	(Stocked)
Lathe and Grinder Centers	(Partial Stock)
Twist Drill Blanks	(Standard Design)
Shear Type Tools	(Standard Design)
Cut-Off Tools	(Standard Design)
Grooving Tools	(Standard Design)
Plug and Ring Gage Bushings	(Standard Design)
Drill Jig Bushings	(Standard Design)
Roller Turner Tools	(Standard Design)
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WEST COAST . . .

• Land versus ocean based transports . . . Coast shipyards slowed by shortages but are expected to outbuild rest of U. S. two to one.

SAN FRANCISCO — Drowned out by shouting, from California to the Gulf, of proposals to solve America's overseas transportation problem by a fleet of huge flying boats are rumors that a large Pacific Coast aircraft plant designed for the production of a new model flying boat will not be used for that purpose.

The plant, now nearly completed, is being built by the government for operation by one of America's leading heavy aircraft builders. An entirely separate unit from the long established plant in which this manufacturer is turning out land bombers, this new plant was to have been devoted entirely to a new model Naval aircraft. Even its location was chosen for convenience in testing aircraft which could land on the water.

The flying boat which was to have been built at this plant came out of the dream stage on to the drafting boards about two years ago. Not more than a month ago test flights were announced. Last week the rumor became contagious that all commitments anticipating the construction of this plane at the new plant had been cancelled. The plant, so the story goes, will be used to produce another type of plane. The manufacturer, his lips sealed by military regulations, has no comment. None of the armed services has made any announcement and probably will make none. Thus, the story stands as pure rumor and can be accepted for whatever measure of value you choose to give it.

Some who accept the rumor will interpret it as an omen that the flying cargo fleet idea is fertile and is about to germinate in this nearly completed Pacific Coast aircraft plant rather than at Andrew Jackson Higgins' unfinished shipyard at New Orleans.

When Henry Kaiser launched the idea of flying freighters a few days ago along with the hull of an ugly duckling, this vision of safe transoceanic transportation went to the head of an American public eager to obliterate the unpleasant truth of the U-boat menace. Sober reflection should modify too ready acceptance of the flying cargo-boat as the ideal "secret weapon."

The bulk of announced merchant vessel sinkings have been in the Gulf of Mexico and along the Atlantic Coastal lanes. This suggests that the harassed traffic largely originates and ends at points on the American continent. Therefore, if you skip the early stages of discussion and arrive at the conclusion that air transport is the logical means of safely handling freight, why not use a land type aircraft? Even if you propose cargo aircraft primarily for intercontinental transportation of cargo and troops, the old-fashioned personnel and cargo transport offers a more easily attainable immediate goal than the mass-produced flying boat.

Although Pan-American clippers were first used on transoceanic commercial hops, they were about to be succeeded on some overwater routes by land planes when

AIRCRAFT PRODUCTION STRATEGISTS: Southern California aircraft plants are freely exchanging ideas and information. Photo shows the Aircraft War Production Council's advisory committee on production, representing eight leading firms. Seated, left to right—Jack Pierson, Douglas; John Demarce, Consolidated; H. Virgil Guadette, Lockheed; H. Bowling, Consolidated; E. Malloy, Ryan; C. Sharpe, Vultee; J. J. Fluck, North American; C. C. Hilliard, Douglas. Standing, left to right—R. A. Lawson, Vultee; Harris MacIntosh, Vega; George Pruden, Vega; R. R. Nolan, Northrop; Paul Buckner, Northrop; L. H. Provost, Douglas; T. O. Heydenfeldt, North American; G. E. Barton, Ryan; and J. E. Young, Douglas.

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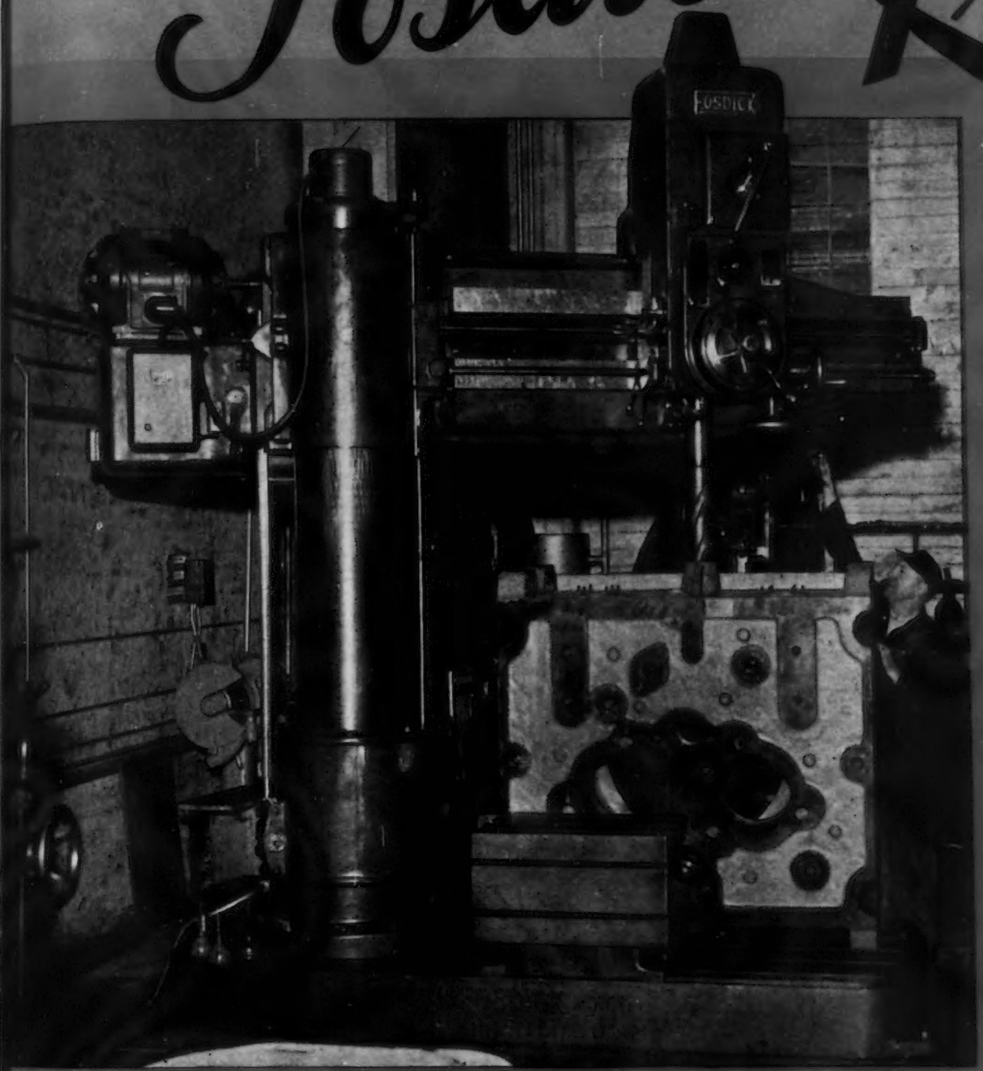
Fosdick Radial



DISPLAYS VERSATILITY ON HEAVY DIESEL ENGINE WORK IN CONTRACT SHOP

★

• Drilling and tapping a large number of various sized holes, and spot facing bosses are a few of the many operations performed by this Fosdick Radial on this cylinder head for a 6 cylinder 6,000 H.P. diesel engine.

This is a contract job and the contractor likes the way this Fosdick Radial handles a large number of varied operations quickly—efficiently—at low cost.

Many plants working 24 hours a day on War contracts are having equally satisfactory results with Fosdick Radials—so can you.

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FOSDICK MACHINE TOOL COMPANY
CINCINNATI • • • OHIO

war broke. One such substitution was to be made on the California-Hawaii service. Where their use is possible, land based planes are more economical. Fuselage construction does not have to be so heavy, and the total weight of the craft is considerably reduced. Consequently, less powerful engines are required and fuel consumption is less. If you carry less fuel, you can carry more passengers and more cargo. The nightmare of the constant reaction of the aluminum hull with salt water is practically eliminated. Last, but not least, less material is needed.

The flying boat is still supreme on extremely long ocean hops where adequate landing fields for large planes cannot be provided at terminii or way points. When there was a probability of emergency landings on the water, the flying boat had and still has advantages. But when direct service is contemplated between this country and Great Britain or continental Europe, the land transport should fill the bill.

Flying boats have performed outstanding service on patrol duty over the ocean. Consolidated's Catalinas, particularly, have written a glorious chapter in the history of Naval aviation. Still heavier flying boats have found a place where the principal need was for an aircraft which could travel many thousands of miles and spend several months away from home base. These requirements are in contrast to the present need for direct line cargo and personnel carriers.

If you come to the conclusion that land based planes are the best bet, you will be able to lay your finger upon one instance in the American war program where the practical men, the "doers," were months ahead of the dreamers. Back issues of THE IRON AGE more more than hint at the program for freight-carrying aircraft. More has been done than could possibly be said or written.

As a side-light upon the current offer by Henry J. Kaiser to devote his shipyards to the construction of flying boats, it is locally recalled that he voiced the same idea at a Portland, Ore., launching several weeks ago. At that time, for some reason, the suggestion barely made the local newspapers. No echoes were heard. But when Mr. Kaiser proposed the cargo carrying air fleet for the second time a few days ago, he found a more receptive press which carried the message to Garcias scattered from New Orleans to Washington. If the Kaiser offer is not accepted, it will be no discredit to its maker—his contribution to war production along other lines cannot be minimized.

PROMOTING PEACE OF MIND AT THE TAKEOFF: Positive inspection on the field is the aim of this portable "tear drop" X-ray trailer for U. S. Army Air Forces. If a prop or landing gear assembly is found to have suffered a hidden crack, the plane is grounded until repair is made. The device was designed by Tom Triplett of Triplett & Barton at the Lockheed Aircraft Corp. plant in Burbank, Cal.

LACK of material continues to slow down Coast shipyards. In Oregon, one yard official sighted five ships which could have been delivered in the past 50 days, but were not because of lack of steel. Currently, it is apparent that the unexpectedly rapid shipbuilding construction pace has out-distanced the materials production program. Yards currently are levelling out a production schedule based upon maximum possible allocation of steel. Personnel adjustments will be made for the next three months, but no wholesale layoffs are expected. Per capita output continues to increase.

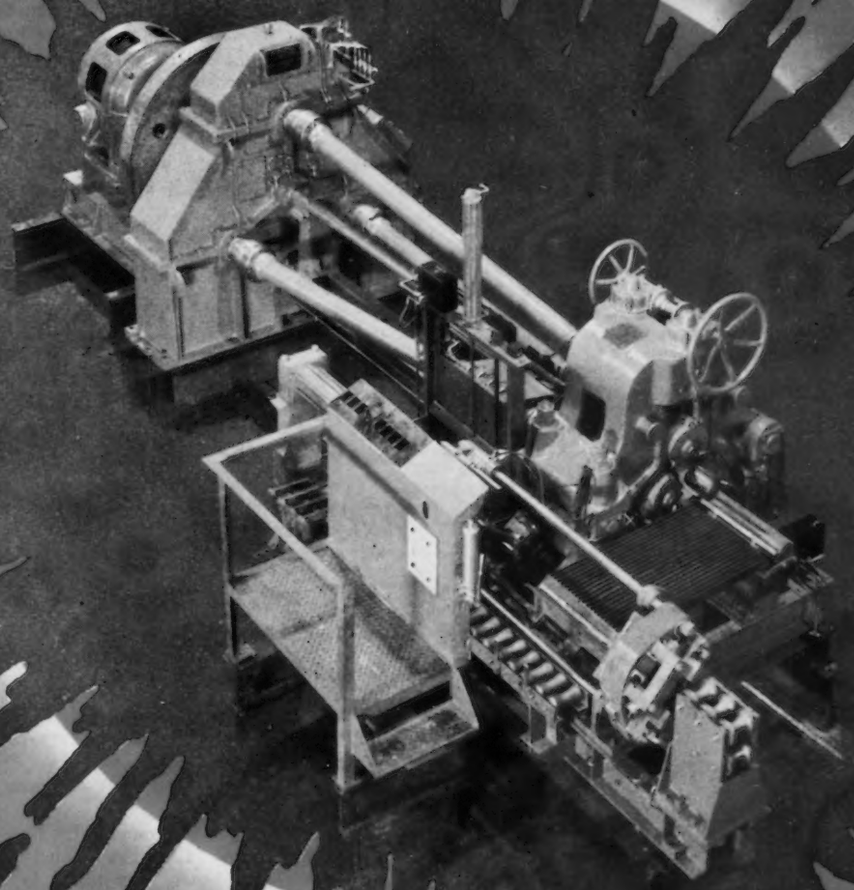
If present production rates can be maintained, Pacific Coast shipyards will outbuild the rest of the country in number of ships two to one by the end of the year, D. W. Fernhout, regional chief of the Maritime Commission plant engineering section predicts. He stated that later in the year Coast yards will employ 375,000 workers, 150,000 of them in the San Francisco Bay area.

With a temporary lull in aircraft wage negotiations, personnel turnover continued to trouble the aircraft plants. Over the signature of the United States Employment Service, Boeing carried large advertisements in Coast daily newspapers seeking to recruit 2300 engineers and engineering draftsmen, some of them for employment in the Midwest. Cooperating with the Employment Service, the company refused applications from those already engaged in war work. A minor flurry was created in Los Angeles when an aircraft plant transferred more than 1000 workers from its plant there to its new Midwestern factory to serve as a labor nucleus.

PRELIMINARY drilling of Coast iron deposits by the Bureau of Mines is reported to confirm previous estimates as to quantity. Because of their proximity to Bonneville power, drillings at the Scappoose, Ore., deposits, near Portland, are attracting the most attention. Most Pacific Northwest sponge or pig iron proposals are built around these deposits.

A total of 1860 potential "bottlenecks" in war plane production was averted in Southern California's eight major aircraft plants in June as a result of the work of the Aircraft War Production Council., Inc., it was disclosed in the monthly reports of the council's committees on engineering and standards, and material.

EXPLODING
ALL PRODUCTION RECORDS



Witter Mills have rolled peak hourly productions as . . . . . .

425 75 m.m. 290 105 m.m.

220 155 m.m.

(from actual records)

Let us explain how you can start with a minimum weight billet or 25% less steel and eliminate the rough machining operation.

SALEM ENGINEERING COMPANY

SALEM ENGINEERING CO., SALEM, OHIO

Fatigue Cracks BY A. H. DIX

Scouts Cause Paper Flood

You're on the wrong track as usual in your explanation of the paper shortage's sudden reversal. It was the Boy Scouts. They collected so much they busted the market. About a week ago the junk collectors struck in Detroit. They wanted lower rental rates on horses because the price of waste paper had gone so low they couldn't make any money. —*George Appel*

• • • Our admiration for the Boy Scouts of America is profound, so much so that we will give odds on the success of any movement that great, hard-worked organization backs. It is long on performance, and short on talk.

Now that the waste paper drought has been changed to a flood, we recommend that Scout energies converge on copper. Washington trepidly suggests beginning with bronze plaques. Plaques are two-bit stuff. The average outdoor bronze statue must outweigh a thousand plaques, and these should be meat for the Scouts if the campaign is properly handled.

It is well-known that every town has outdated statues it would like an excuse to get rid of. The Scouts should circulate petitions among the citizenry, reading like this:

The country is in dire need of copper to help win the war. The statue of Zebulon Verdigris, Hunkerville's great city father, which stands in front of the City Hall, contains ..... lb. of copper. Were Zebulon Verdigris alive today he would be the first to suggest contributing his statue toward the national emergency. No statue is needed to keep his memory green. Please sign below.

Of course, practically everyone would sign. The Scouts have rope suitable for statue demolition. Sledge hammers could be borrowed from local scrap yards. Bands could play. Speeches could be delivered. Scrap would pour in. And the town would be free of some eyesores.

But war or no war, we think that no public figure should have more than a 25-year lease on a choice site. After a quarter century he should step down and make way for a later hero whose memory is less shopworn. Too many public squares are cluttered up with frock-coated figures that mean nothing at all to the present generation.

The WPB has an opportunity to make a necessity of a virtue, and vice versa. We will be glad to do our bit by putting the finger on a half dozen prime candidates for the melting pot.

Blurb

• • • In the publishing business a high subscription renewal percentage is prized above new white wall tires and pants with cuffs. Your favorite family journal has always been one of business paperdoms Warmerdams, topping the altitudinous 80 per cent mark year after year.

So fast has the family grown during the past several years that we feared we would have to move the stick down a couple of pegs, thinking that the newcomers wouldn't assay as high in loving friends as the old-timers. But our fears were groundless. Our current circulation statement shows that we cleared the four out of five renewal mark by 43/100ths of 1 per cent.

Purist

• • • **You quote from the New York Herald-Tribune, "Five hundred persons were on the observation deck at La Guardia field when the former King of England arrived. Catching sight of the duchess over the tail of the Lockheed, he called 'Hell, darling . . . '**

The photographers missed the boat when they didn't get a shot of 'the duchess over the tail of the Lockheed.' How did she get there?"

—*Harold W. Lownie, Westinghouse Electric & Mfg. Co., Trafford City, Pa.*

Last week's Satevepost, or maybe Collier's, had an article on soldiers' diet which says, "He (the soldier) eats better than 60 per cent of the civilians in the U. S."

No wonder we're short of help. Couldn't they be induced to substitute Germans? —*Deac*

We are glad that we, unlike these other publications, are never guilty of inexactness of expression. Lately we did refer to a certain company's "past history." But that is only a venial sin, and we would never think of saying "future prospects."

Our only other recent fall from grace was in speaking here of "six people" instead of "six persons." For that slight stumble a member of your favorite family journal's advertising staff has put the bee on us. We know that *persons* and *people* are not interchangeable. You cannot, for example, say, "Only one people showed up at my going away party." But to us "six persons" sounds stuffy, and we will probably go on using *people*.

Losing Battle

• • • This same individual has been conducting a one-man campaign for years to have the word "proven" stricken from the language. He contends that its use is permissible only in the Scotch verdict, "Not proven." Even our drug store dictionary does not support him, and as far as usage is concerned, we see a dozen uses of "has proven" for every "has proved."

"Proven" is more agreeable to the ear and easier to enunciate than "proved," and as a past participle it seems to be going the way of the stiff collar.

Button, Button

• • • If we were looking for something to criticize we would pick on the little figures (1, 2, 3) your favorite family journal uses as flags for footnotes. Most of the time we run right over the figures when reading the page and when we get to the bottom and see the footnote we go back and try to locate the figure. We are rarely successful, and thus our flock of frustrations grows.

Or if we do spot the figure as we read the page, we jump to the bottom of the page to read the footnote, and then have trouble in finding where we left off reading. In the interests of streamlined transfer of ideas from printed page to cerebrum, why can't the brains department put the footnoted words in brackets right in the text?

If there are good reasons why this can't be done we are not interested. Like the Irish judge who refused to listen to the defense, our mind is made up and we don't want to become confused.

Stopper

• • • When These Fellows Were Riding Tricycles—*The Sisalkraft Co.*

Sticks and Stones . . .

• • • Our airing of Hesiod's acid remarks concerning the era that gave your favorite family journal its name—"*degraded, degenerate, unjust, impious*"—has produced a ripple of sympathy. A Canadian firm addresses us as "The Iron Man" and a telegram to the brains department from its Detroit lookout reached here addressed to "The Iron Gate."

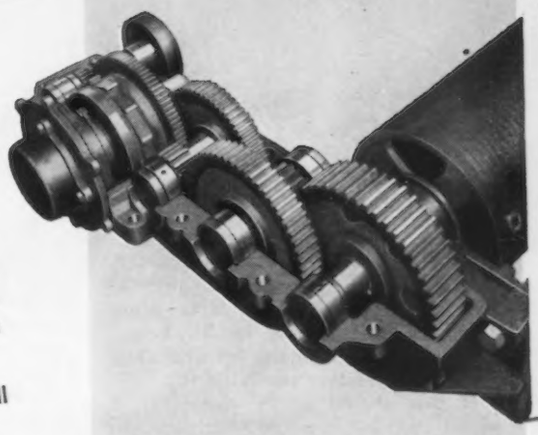
Puzzles

• • • The answer to last week's thistledown load on your cerebrum is 15.

Two minutes should do for this:

When traveling in opposite directions two trains take three seconds to pass one another, and when traveling in the same direction they take 35 seconds. If the faster train has a speed of 38 miles per hour, how fast is the other train going?

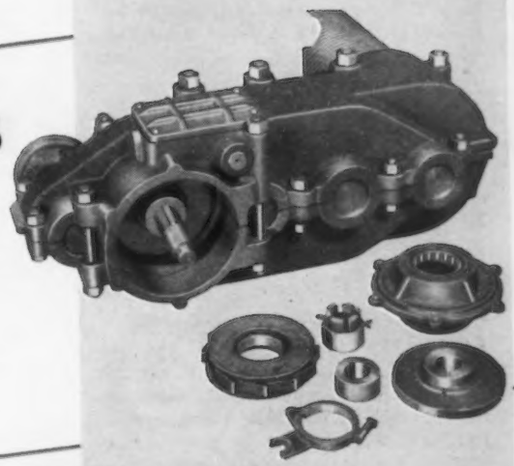
You may never do this on a *Northern* HI-LIFT HOIST



A Northern Hi-Lift Hoist will serve for years without requiring any attention to the gear mechanism. The design and construction forestalls wear. Gears are machine cut, heat treated steel—shafts are turned and ground steel. Roller bearings are of ample size, and the whole mechanism is splash lubricated.

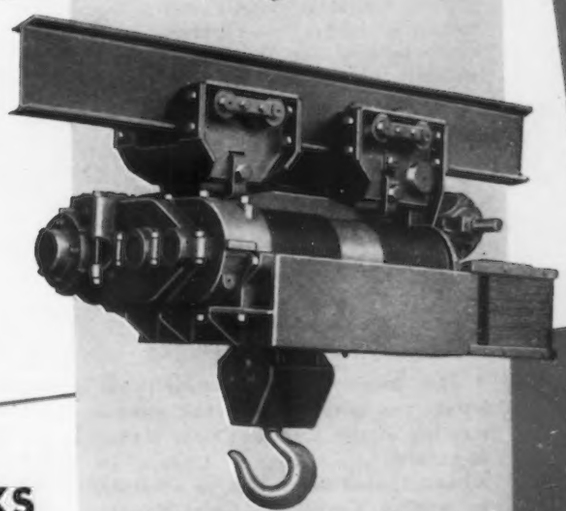
But if you do have to open the case, note that it is an easy job—and all parts are immediately accessible.

Mechanical Load Brake Renewals are infrequent but easy



The Northern Mechanical Load Brake is a rugged, long-lasting mechanism. But all brakes have wearing surfaces which must be renewed at intervals. You can do it very easily on the Northern Hi-Lift Hoist—just loosen a few bolts, and the brake mechanism is removed without disturbing the gear case.

Delivery on Heavy and Light Duty HI-LIFT HOISTS



Northern Hi-Lift Hoists are built in 1000 lb. to 15-ton capacity—in single motor and two-motor types. Two-motor hoists may be fitted with cabs. We are in good position to make excellent deliveries on all commonly used types.

NORTHERN ENGINEERING WORKS

General Offices: **2607 Atwater St., DETROIT, MICH.**

NORTHERN CRANE & HOIST WORKS, Limited • WINDSOR, CANADA

Offices at—44 Whitehall St., NEW YORK • 547 Union Trust Bldg., PITTSBURGH • 53 West Jackson Blvd., CHICAGO • 2428 Spring Grove, CINCINNATI • 4135 Gratiot Ave., ST. LOUIS • 913 South 38th St., BIRMINGHAM • 5724 Navigation Blvd., HOUSTON 1679 University Ave., ST. PAUL

Write for New Catalog of Hi-Lift Hoists

Dear Editor:

SPONGE IRON

Sir:

Senator Champ Clark, of Missouri, is bringing up the controversial question of sponge-iron, and it is being discussed quite freely in St. Louis. If there is any information available, I would appreciate receiving it.

If this should prove successful, I would imagine it would eliminate the blast furnaces. Also, it is my understanding that the Steel Corporation spent considerable money investigating this process years ago,

I am looking for this information so that I can prove to people in this area that this process is not commercially possible at this time, and especially with our low grade ores in Missouri.

P. L. LORING,
District Sales Manager,
Inland Steel Co.,
St. Louis

• By now you have last week's IRON AGE, which should supply the information you require. It always amazes us to see how easily senators and politicians can talk about a subject so complex that it pretty well baffles technical men. And they seem to master the problem with complete ease and bring forth world shaking pronouncements.—Ed.

GEAR HOBBING

Sir:

Kindly advise us as to where we may obtain a copy of the paper prepared by L. W. Falk covering hobbing of large gears, especially for marine work.

A. R. RETHEY,
Contracting Engineer,
Consolidated Steel Corp., Ltd.,
Los Angeles

• The paper referred to in your letter was given before the annual meeting of the American Gear Manufacturers' Association. A copy in mimeographed form can be obtained by writing Newbold C. Goin, Managing Secretary, American Gear Manufacturers' Association, 602 Shields Building, Wilkinsburg, Pa.—Ed.

STEEL DIRECTORY

Sir:

It is requested that the following publications be forwarded to the Watertown Arsenal Library for official use:

"Directory of Tool Steels," by T. W. Lippert,
Articles on Electroplating of Nonmetals in booklet form.

If there is any charge for these, please let us know so that an official order may be placed.

WATERTOWN ARSENAL,
Watertown, Mass.

Sir:

We are having a great deal of trouble relieving our form cutters on a large relieving lathe. The tools do not hold up well, seemingly because the cutter blanks are hard to machine. For cutting tools we use 18-4-1 H. S. steel heat treated to Rockwell C 28 to 30, and we are following general practice in heat treating our blanks before relieving in order to get a good finish.

WAYNE CATHER,
Factory Manager,
Brown Tool & Mfg Co.,
Rising Sun, Ind.

• While it is difficult to identify the trouble without seeing the actual operation, we believe that one cause may be that your steel is too hard. We might suggest that the cutters be hardened to Rockwell C 20 to 22, and that the relieving tools be 60 to 62 on the same scale. When the tool is cutting, it should be cutting at all times, and not allowed to glaze the work. Tools should have a 22-deg. end clearance. The tools should be 1-in. thick and held in the tool holder rigidly. Back off all cutters dry until the time comes to finish and then run the machine slowly, using equal parts of sperm oil and turpentine. In the event a lathe is used for backing off, the tool holder should be removed and a block made to hold the tool with screws on the side and top. The machine should be tightened all over.—Ed.

SALES COMMISSIONS

Sir:

It may, perhaps, not be in your line, but we would like to have some information regarding the compensation that is paid to salesmen. For instance, if a salesman were selling $50,000 a year, his commission would probably be a certain percent; if selling $100,000 per year, his commission might be changed. As the sales go up, how is this question handled by some of the representative companies?

B. STOREY,
General Manager,
Atlas Metal Works.

• Compensation to salesmen doing a volume business, particularly in heavy machinery, is often based on a salary plus a commission of ½ to 1 per cent. Some companies have dropped the commissions lately, however, on the ground that remuneration was becoming too large and the salesmen were flooded by orders, many of which they did not even solicit.—Ed.

WELDING REPAIRS

Sir:

Will you please tell me whether an arc weld on SAE 4130 steel can be repaired with a torch? The parts are about 3/32 in. thick and repairs would be on small cracks, craters, split welds, etc. The material is usually annealed and heat treated after welding, and the repair is made after the part is annealed.

A. VANDER HENST,
Grand Rapids, Mich.

• We see no reason why this cannot be done successfully, and we understand that a number of repairs have been made in this way on light gage material. A carbon pencil arc might also be used, and so could G.E. atomic hydrogen equipment. Incidentally, there are a number of devices available for attachment to welding machines to eliminate craters.—Ed.

PRP

Sir:

Your June 25 issue contains a complete AC symbol list. Since I don't want to mutilate our copy, I wonder if you could spare us 3 copies of this list?

E. V. MORROW,
General Manager,
Neveroil Bearing Co.,
Wakefield, Mass.

• Our 12-page booklet "How to Operate Under PRP" also contains this list. Its price is 25c each in quantities up to 10 and 15c a copy in larger amounts.—Ed.

AIRCRAFT PRESS WORK

Sir:

As soon as available, would you be so kind as to let us have a copy of your 24-page booklet embracing the following articles:

"Stretch - Forming Contoured Sheet Metal Aircraft Parts"
"Drawing Dies for Air Frame Stampings"
"Forming Convex Flanges and Joggles"
"Hydro-Press Forming with Rubber Platens"

EDWARD A. LYNCH,
Edward A. Lynch Machinery Co.,
Ardmore, Pa.

Sir:

It would be appreciated if you would send us six copies of your 24-page booklet on sheet metal forming in aircraft manufacture.

C. L. HIBERT,
Welding Engineer,
Consolidated Aircraft Corp.,
San Diego, Cal.

PRIORITY GUIDE

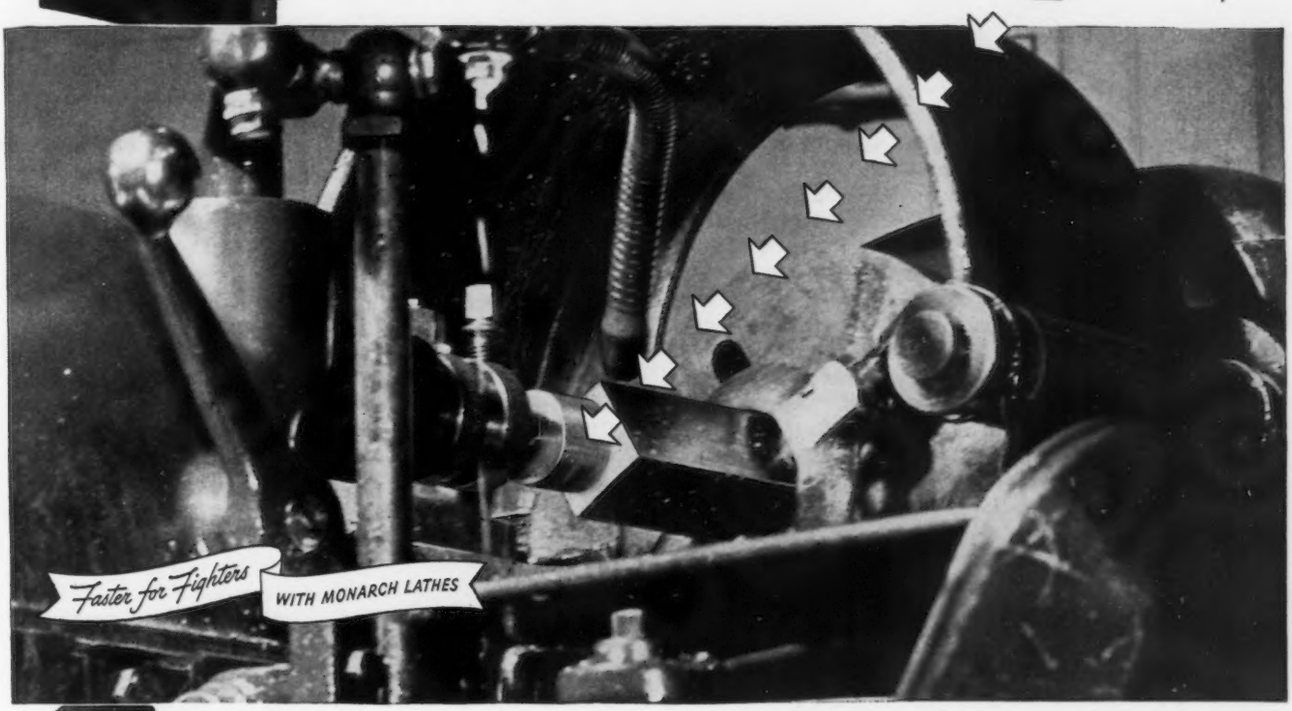
Sir:

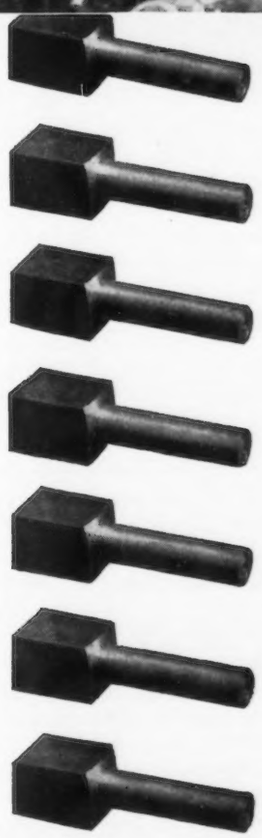
The Iron Age Priorities Section has just come to the attention of this office. This publication would be very helpful to a number of offices in the Industrial Planning Section.

If it is possible to furnish five or six copies, they would be very much appreciated and, no doubt, would prove of considerable value to the personnel using them.

P. SCHNEEBERGER,
Colonel, Army Air Forces,
Chief, Industrial Planning Section,
Dayton, Ohio

1948 BLOWS PER MINUTE





. . but the Monarch Lathe can take it!

Turning square stock with an interrupted cut puts a heavy strain on the lathe—especially at high speeds. The stud illustrated is cut from 1⅞" square stock (SAE-1020), with a Tungsten Carbide tool, at a speed of 487 RPM—creating 1948 hammer blows per minute.

But the Monarch Model W Lathe takes this work in its stride. Its design and structural strength provide the rigidity to take this interrupted pounding action. Bearings of adequate size support the main spindle and other shafts. The bearing area of the carriage on the bed, and the bearing area of the compound rest to the carriage are designed in correct proportion to provide the rigidity to stand up under such heavy punishment.

Yet the same lathe that takes, without flinching, these rough interrupted cuts performs the finest of finishing operations with unfailing accuracy.

Therein lies much of the utility of Monarch Lathes of today—which you can continue to depend upon to do your turning work—tomorrow.

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

MONARCH LATHES

COVER THE TURNING FIELD

This Industrial Week . . .

- ***Overdue Repairs Again Soften Operating Rate***
- ***Production Directives Leading to Stabilization***
- ***Sikorsky Helicopters May Combat Submarines***
- ***Shell Casing and Bullet Cup Production Confused***

EVEN German steel production is increasingly pressed to handle the enormous demands of modern warfare, and either for technological or political reasons the entire responsibility for integration and maintenance of output has been dramatically shifted from state bureaucracy back to industrial autonomy (p. 96). The Gestapo, however, still is charged with ferreting out scrap supplies. Meanwhile, in the United States each day brings its new and varied alarums of steel shortages, and disconcerting consternation as to the apparent inadequacy of the metals industry to implement a full war effort. But, certainly in the case of steel, there is something well-nigh irreconcilable in the so-called shortages in innumerable directions, while at the same time the industry is this week operating at 98.3 per cent of capacity, representing 1,671,100 tons of ingots or approximately 1,200,000 tons of finished steel. The drop of four points in the operating rate from last week comes from additional open hearths temporarily down for badly overdue repair and rebuilds, with the scrap deficiency for the moment an almost negligible contributing factor.

UNDOUBTEDLY there has been some deterioration in steel supply, but tales of tank plants and other prime armament producers closing their doors are greatly exaggerated. Activities of certain truck plants certainly have been curtailed, but for months heavy production in that field has been under critical surveillance. Ship plate continues to be spotty and tight, but additional improvement is in prospect, mostly at the expense of sheet, strip and structural production. Of particular significance is that for some months lend-lease shipments of steel have taken really terrific bites out of output, but now export is being severely pared down to a more digestible level. The critical domestic tightness in semi-finished steel and bars should quickly reflect this action. Furthermore, the current widespread and very vocal fears of many steel users regarding their supply position should within a fortnight sink to whispers as the unlamented priorities set-up is blanketed by what the WPB designates as production directives, but what many others insist on calling the quota system. A strict, sensitive and flexible statistical control over steel usage has long been overdue to kill off careless treatment of delivery dates, poor timing of deliveries, and growth of unbalanced stocks. Production directives give every promise of intelligent and strategic application of each week's steel output, with concomitant corking up of the many mysterious sump holes into which so much steel has drained in the past.

WPB's decision to trim steel expansion plans about 10 per cent (p. 87) indicates a realistic appreciation of the imperativeness of winning the war by proper utilization of 98,300,000 tons of capacity, rather than drain more steel away from current production to gain a few million more tons of capacity several years hence. Being skeptical also of sufficient and proper quality of scrap to support such capacity, WPB will press for an additional 3,000,000 tons of pig iron capacity in its 1943 building program, representing an expenditure of well over $75,000,000. OPA has announced bitter opposition to any moderate and overall rise in scrap prices to accelerate the flow, the apparent preference being to employ public scrap campaigns to offset any reduction in activity of the small scrap collector. Also, considerable dependence is being put on the growing activities of the Metals Reserve Co., in drawing in remote scrap, importing scrap, and tackling the more sizable and costly wrecking projects. The latter involves such varied activities as drawing several old hulks from the river in the Philadelphia area, at a cost of perhaps $35-$40 a ton, and ripping girder rails out of concrete at a price probably near $75 a ton. Even higher costs might be involved in removing old car rails, an extensive program for which is under way in New Jersey (p. 94) pointing toward a recovery of over 60,000 tons in 1943.

ALL these mundane ramifications of metal supply and utilization, however, pale before the glow of Henry Kaiser's insistent demands for the creation of huge fleets of 70-ton, 500-ton or heavier flying boats to outsmart the submarine menace. The man who is bettering the World War I shipbuilding record of Skinner & Eddy Corp. sniffs at possible limitation of materials for the super-planes as best solved by men who "go out and break bottlenecks." Meanwhile, critics view with alarm the inevitable current drains on strategic materials involved in glorified bottleneck breaking processes and are inclined to point out that there is a time factor applying even to Kaiser. With plenty of money, and with much help from other producers, Kaiser's Fontana, Cal., plate mill will require a year to go into production, and will involve shipping coke from Utah; and Kaiser's Permanente magnesium plant, a mammoth and costly affair, has encountered many vexing production difficulties.

Meanwhile, the Navy is blowing hot and cold on the Sikorsky helicopter for use as a submarine spotting device, operating off the decks of mercantile ships and possibly off the decks of Navy vessels. Present plans call for a large number of helicopters to be built and at least one Detroit firm is participating in the manufacture of parts for the craft. The Sikorsky helicopter is a radical type aircraft, not to be confused with

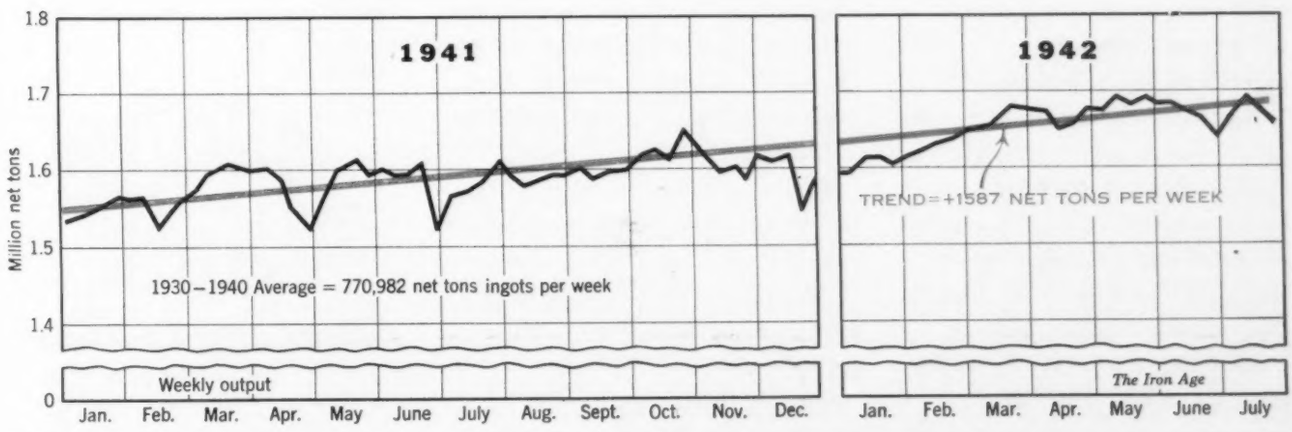
the Autogiro, designed by Igor Sikorsky of United Aircraft Corp. It takes off and lands vertically, flies in any direction—forward, backward or sideways. It can hover over a spot for an indefinite length of time.

THE military, particularly the Army, has been inclined to be quite arbitrary in demands as to both quantity and quality of metals, and only recently has come to grips with the shortage problems that are standard features of technology abroad. For instance, the Russians, and particularly the Germans, depend on steel shell casings in view of the complete inability of copper to stand the drain of modern warfare. The Russians report many captured German guns with steel cases frozen or burst in the breeches, and considerable somewhat uncorrelated research has been under way in the U. S. to switch from brass to steel cases with, of course, optimum performance. Even though Secretary of War Stimson said last week that a complete shift to steel would be made within the next few months, he was apparently indulging in some fantasy in view of the recent shift in metallurgical attack on the steel casing fabricating problem and also because of the plant, die and operational problems involved. A related shift from brass to steel in small arms ammunition likewise is visualized, but again there is underlying confusion as to the proper technology to use.

STILL another large drain on copper is poised for conservation—the bullet cup for .30 and .50 caliber cartridges. This cup is conventionally made of gilding metal (90 copper plus 10 zinc) and individually is almost insignificant as it covers the bullet only a fraction of an inch to bite into the rifling. However, when bullets are made in billions, the tonnage of copper used is tremendous. A Pittsburgh company has for three years made a steel strip clad on both sides with gilding metal from which such cups are fabricated, each ton of the ply-metal representing a saving of 1600 lb. of copper and zinc. Over a billion cups have been supplied to the Chinese and Canadians, with excellent service performance. The U. S. Army still uses solid gilding metal, but shows some intention to switch to the ply-metal, and the Pittsburgh company has just made the process available to many other steel companies without charge to assure adequate future supplies. The somewhat leisurely paced shift, however, is additionally highlighted by the rather exasperating incongruity of the original company practically shut down for lack of gilding metal to put on the steel strip, while at the same time solid gilding metal strip is still in maximum production elsewhere. And, surprisingly enough, no action whatsoever has yet been taken on a six-week-old Russian order for 1000 tons monthly of the ply-metal, and a South African order for 30,000,000 cups has been kicking around for six months with no government O. K.

THE Army has reason to be proud of its radically new, efficient and very fast gun manufacturing technique, which incomparably surpasses any practice the Axis is known to possess. In tank manufacture, the Presidential announcement of 1500 per month production is somewhat misleading in that the figure includes a high proportion of light tanks. The medium tank, the real work-horse and slugger of modernized warfare, is currently made up partly of the M-3 design, with a none too urgent shift over to the M-4. While the M-3 has recently been belligerently glorified vis-a-vis the German PzKw IV, some observers hope that M-4s flowing from plants such as the new Fisher arsenal (P. 68) can get to the battlefront in quantity before the Germans start mounting their favorite 88-mm. gun on tanks in the manner Marshal Rommel recently improvised in the desert. The constant increase in gun size and shell velocity on tanks may also influence the design of the American heavy tank which today also carries the 75-mm. gun and is being turned out at a rate both planned and actual which is anything but impressive. Banks of standard automotive engines are now used in the M-4, and thus there is less pressure on the aircraft engine industry.

Of further interest is the realistic practice of the new Fisher tank plant to offset the tightness and many months' delay in alloy cutting steels by widespread tool reclamation. Elsewhere in the country there is a slowly growing appreciation of additional time and material savings possible by uniting a small cutting edge of alloy steel to a common steel body, rather than using a solid alloy steel tool. One company even reports expectations of so maintaining its cutting tools for the war's duration entirely from scrap high speed steel on hand. But, yet, this type of tool steel conservation has not begun to approach the complete adoption of such practice demanded in England by a recent order (p. 88).



Steel Ingot Production by Districts, Per Cent of Capacity

	Pitts-burgh	Chi-cago	Youngs-town	Phila-delphia	Cleve-land	Buf-falo	Wheel-ing	South	De-troit	S.Ohio River	West	St. Louis	East	Aggre-gate
Week of July 23...	98.0	102.5	99.5	92.0	100.0	106.5	86.0	98.0	96.5	105.0	102.0	108.0	85.0	98.7
Week of July 30...	97.0	100.5	99.0	92.0	96.0	108.5	86.0	97.0	106.1	100.0	102.0	108.0	93.9	98.3

* Revised

Two TOOL STEELS CAN CUT AS CHEAPLY AS ONE

WHAT'S more important, two tool steels can cut twice as *fast* as one, and speed is the prime urgency in war production.

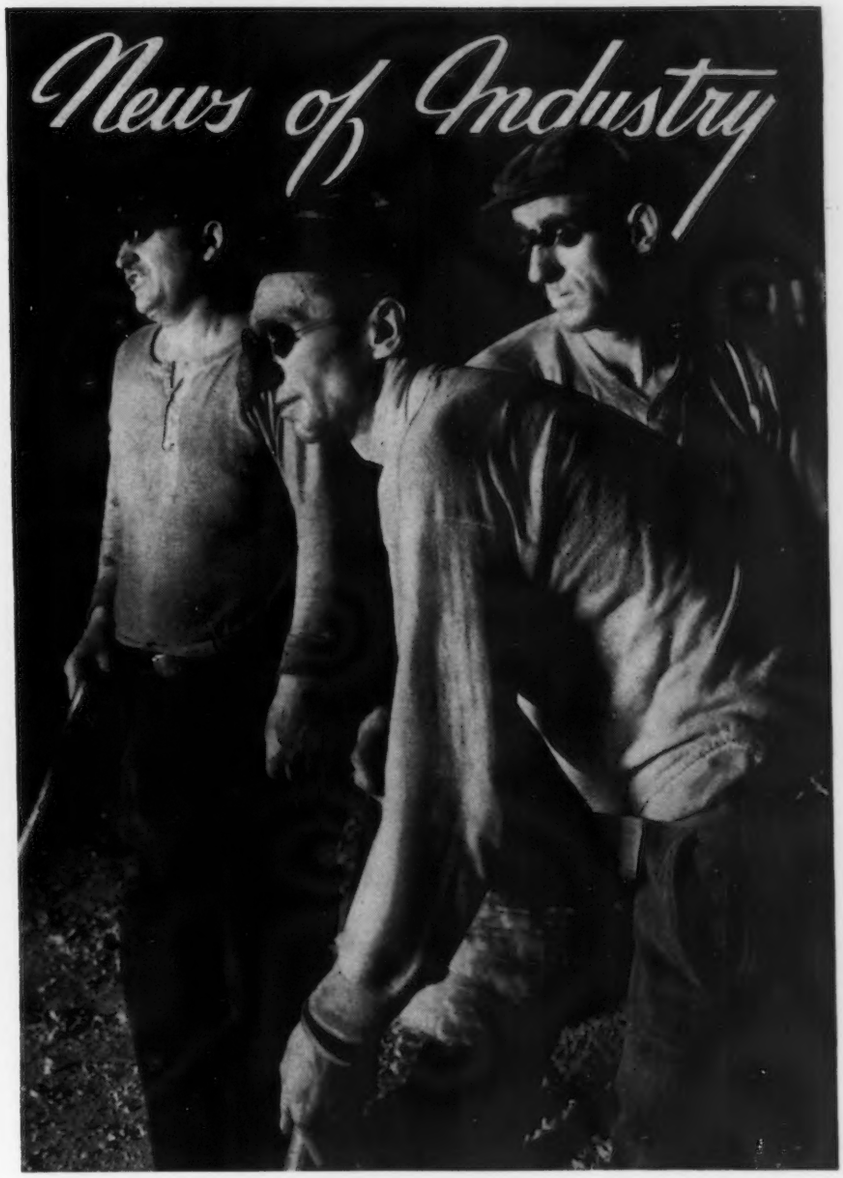
But there are ways of increasing production beside installing more modern types of machine tools. A better tool steel, or one better suited to an individual job, can materially speed up the work your existing equipment is capable of doing.

Take the case of a big Detroit plant, using DBL High Speed Tool Bits instead of a high-tungsten variety, machining castings of X-1340 steel with a surface hardness of 33 Rockwell C, and a subsurface hardness of 26-28C. The DBL Tool Bits showed 30% increase in work done between grinds, running at 166 RPM against a previous speed of 100 RPM.

Our Service Staff is ready to help you team up tool steels with your production jobs, for more work done per machine. They'll show you the best *alternate* steels, too, as a precaution in keeping the lines moving.

AL
STEEL FOR THE NATION'S WELFARE

Allegheny Ludlum
STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA



• • •

10 Per Cent Reduction In Ingot Expansion Recommended by WPB

Washington

• • • **A steel ingot capacity** for the United States of 98,279,970 tons by mid-1943 was recommended July 24 by the Iron and Steel Branch, War Production Board. This is 9,710,000 tons more than the 88,569,970-ton present rated capacity of the industry and represents a 10 per cent reduction from the 10,762,000-ton increase originally approved on Sept. 30, 1941.

The recommendation was made in a review of the iron and steel expansion program, prepared by W. A. Hauck, head of the steel planning unit of the branch, and representatives of the Army-Navy Munitions Board, following the order of WPB Chairman Donald M. Nelson that all expansion programs be carefully reviewed.

Completion of the recommended program will present this picture of the nation's steel-making capacity in net tons:

	Dec. 31, 1941	June 30, 1943
Pig iron	59,406,410	70,351,410
Ingots:		
Electric	3,741,310	5,759,310
Bessemer ..	6,721,400	6,721,400
Open hearth	78,107,260	85,799,260
Total ingots.	88,569,970	98,279,970

Not only ingots, but coke and pig iron expansion also have been curtailed in the revised program. Here are the current recommendations as contrasted with the original expansion authorizations, in tons:

	Original Expansion	Present Program
Coke	9,359,000	7,083,000
Pig iron.....	13,810,550	10,945,000
Ingots:		
Open hearth	8,744,000	7,692,000
Electric	2,018,000	2,018,000

The increase in open hearth steel capacity will be obtained by three steps. New furnaces will provide 4,891,000 tons of the 7,692,000-ton increase; hot metal from blast furnaces, instead of cold scrap, will account for 2,163,000 tons, and restoring and enlarging old furnaces will bring in 638,000 tons.

Of the total increase in ingot capacity, 5,165,000 tons will be completed in 1942 and the additional 4,545,000 tons brought into production in the first six months of 1943. Many of the projects are on their way to completion at present and some already are in operation.

No such increase in steel ingot facilities can be undertaken without a corresponding increase in pig iron capacity. The report calls for an even larger increase in raw materials facilities to make up for the relatively reduced amount of purchased scrap expected next year and thereafter.

The program actually starts with the expansion of iron mining in New York, New Jersey, Texas, southern California and Utah, and the construction of 21 new ore boats for the Great Lakes. These new carriers, plus present capacity, are expected to fill ore needs through 1944 and thereafter.

The increase in pig iron capacity is planned as follows: from 20 new blast furnaces, 8,118,000 tons; from 6 abandoned furnaces restored, 1,235,000; from enlarge-

ment of 9 existing furnaces, 853,000; from use of sintered ore, 599,000; from use of thinner furnace linings, 140,000.

1942 will see the completion of 6,349,000 tons of this total, with the remaining 4,596,000 to be completed in 1943. Nine and a half million tons will be necessary for merchant iron and ferro-alloys, leaving 60,851,410 tons available for steel making.

Full use of the entire 98,000,000 tons of steel capacity will require 109,463,223 tons of metallics, made up as follows:

Pig iron	60,851,410 tons
Plant scrap	26,828,607
Metal in ore	5,832,400
Purchased scrap	16,000,000

These sources provide surplus metallics of only 51,194 tons, provided purchase scrap is a constant figure. The report recommends additional pig iron capacity to insure against declines in the purchasable scrap supply.

In addition to the steel expansion program, the report also lists a 70 per cent increase in steel foundry facilities to make vital war castings, as follows:

Sponsored by WPB	223,560 tons
Privately financed	501,024
Sponsored by War Department	628,200
Sponsored by Navy Department	41,700
Total expansion	1,394,484
Annual capacity, July 1, 1941	1,896,000
Total proposed capacity	3,290,484 tons

Ingot capacity of 98,000,000 tons, the report points out, will provide 68,796,000 tons a year of finished steel products. Present finished products capacity is approximately 62,998,979 tons.

M. H. Luce to Direct WPB in Oregon, Washington, Idaho

• • • **Chairman Donald M. Nelson** last week announced the appointment of Milton H. Luce as acting deputy director for the Seattle district of Region 10 of the War Production Board. Mr. Luce will supervise the activities of all WPB field offices in the states of Washington, Oregon and Idaho.

Warner & Swasey, Machine Tool Company, Expands 40%

Cleveland

• • • **Warner & Swasey Co.** is expected to have completed a 40 per cent plant expansion by Aug. 1 four months after the expansion was announced.

"News Release" by WPB Rattles Skeletons

• • • **Among the barrels of publicity material ground out at Washington last week was a "news release" from the labor division of the War Production Board telling all about the pay raise won in the plants of the "Little Steel" companies. Excerpts include:**

"Thousands of workers last week celebrated the 50th anniversary of the famous Homestead strike in 1892 by winning their first contracts in all the plants of 'Little Steel' . . .

"Barges loaded with 300 armed Pinkerton guards fought their way into the stockade around the Homestead plant. . . . On July 16, 1942, the War Labor Board made it possible for a steel worker to forget that kind of a fight for organization. . . ."

"The tradition of hostility to steel worker organization goes back 83 years to the days of the Sons of Vulcan, pioneer iron worker union. About every ten years since then there has been a steel strike and the workers invariably have lost. Each time they picked themselves up slowly, because of spies and blacklists, and each time they found enough strength to try again, but were never quite able to outlast the combination against them of powerful companies, police, dwindling strike benefits and hunger."

Automotive Plants' Volume Twice as High as Ever Before

Detroit

• • • **Rapid expansion** in old and new manufacturing facilities of the automobile industry by the year-end is expected to reach a dollar volume on war materials double that achieved in the highest year of automobile production, according to the Automobile Manufacturers' Association's 24th annual edition of "Facts and Figures."

Tin Conservation Hastened By Building of New Mills

Pittsburgh

• • • **The construction of** new electrolytic tin plating mills and bonderizing finishing lines is reported progressing, thereby hastening the conservation of tin in the manufacture of containers. It is estimated that more than 30,000,000 base boxes of electrolytic tin plate may be produced in 1943 and about 8,000,000 base boxes of bonderized plate. This will compare with 5,000,000 base boxes of electrolytic tin plate expected to be produced this year, and 3,000,000 base boxes of bonderized plate. Eventually, the projects now under way will give the United States an annual capacity of 39,000,000 base boxes of electrolytic tin plate.

Since it is estimated that 1943 requirements of tin, terne, black, and hot dip plate may reach 75,000,000 base boxes to cover our needs and those of our allies, it is apparent that 20,000,000 base boxes of hot dip tin plate will be needed. Seasonal influences of the packing industry will necessitate that the bulk of this production be turned out in the first three quarters of 1943.

Tipping of High Speed Steel Compulsory in England

• • • **According to an order** issued April 20 and made effective June 1 by the Minister of Supply, England, no cutting tools can be made of solid high-speed steel, but must be tipped with this critical material. Section 1 of the order (1942 No. 760) reads:

No person shall in the United Kingdom produce any cutting tool capable of being used in a machine tool and made from square or rectangular material where either dimension of the cross-section of the finished tool exceeds ½ in. (unless the smaller of the two dimensions is less than ¼ in.) otherwise than as follows:

By welding or brazing the cutting portion of the tool, which may be any of the steels known as high speed steel, to the shank portion which shall be of steel containing no tungsten or vanadium or cobalt, except under the authority of and in accordance with a license granted or a special or general direction issued by the Minister of Supply.

For articles on tipping of high speed steel, the reader is referred to the March 26, April 16 and June 25 issues of THE IRON AGE, also to an article scheduled to appear in the Aug. 6 issue.

Detroit Will Register Women for War Jobs

Detroit

• • • **As an important step** toward the utilization of women to meet the shortage of manpower in America, a plan has been completed for the registration of all women in the Detroit area to determine the number available to take jobs in war industries. The registration will take place during the week of Aug. 10, Ernest Kanzler, regional director of the WPB and E. L. Keenan, regional representative of the U. S. Employment Service, announced last week.

The registration will cover approximately 650,000 women 18 to 45 years old in Wayne, Oakland, Macomb and Washtenaw Counties. It is the first of its kind ever attempted and is expected to serve as a guide for other parts of the nation.

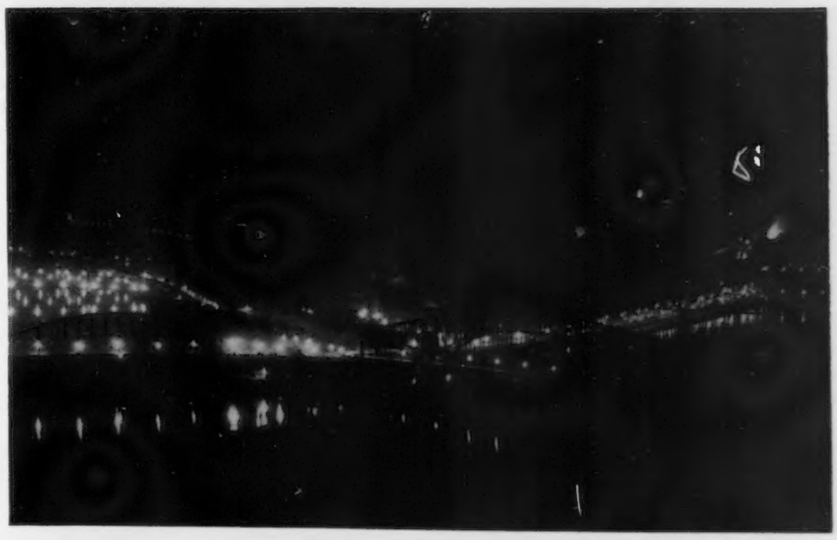
Unofficial estimates indicate that a shortage of some 140,000 workers will be faced here by November with this total increasing as production peaks are approached during 1943.

Of the 650,000 women to be registered, it is expected that upward of 80,000 will be needed in war plants here between now and next November. Employment of women in Michigan plants in May equaled 7 per cent of all workers, or approximately 70,000 women workers.

MRC To Finance Development Of Ore Deposits in Canada

Ottawa, Canada

• • • **United States capital** will be provided to assist development in Canada of marginal and sub-marginal deposits of essential war minerals, under an agreement which has been prepared but not yet signed. The Metals Controller may initiate agreements for the disposal of metals and minerals to Metals Reserve Corp., an RFC subsidiary, at prices permitting production from marginal deposits. In cases where there is an assured tonnage of ore and the property can be put into production within a short time, the United States will give capital assistance. In another agreement now in effect, MRC has advanced to the Aluminum Co. of Canada prepayments for metal.



PITTSBURGH BLOTTED OUT: Pittsburgh at night, always a spectacular scene when steel mills are going full blast, underwent this startling change during a recent voluntary blackout. Bud Scott, photographer, caught it in three stages: fully lighted; half blacked out; and blacked out. Even the bessemer (right) would be dark during the "real thing."

Canada Restricts Zinc and Copper for Engraving Use

Ottawa, Canada

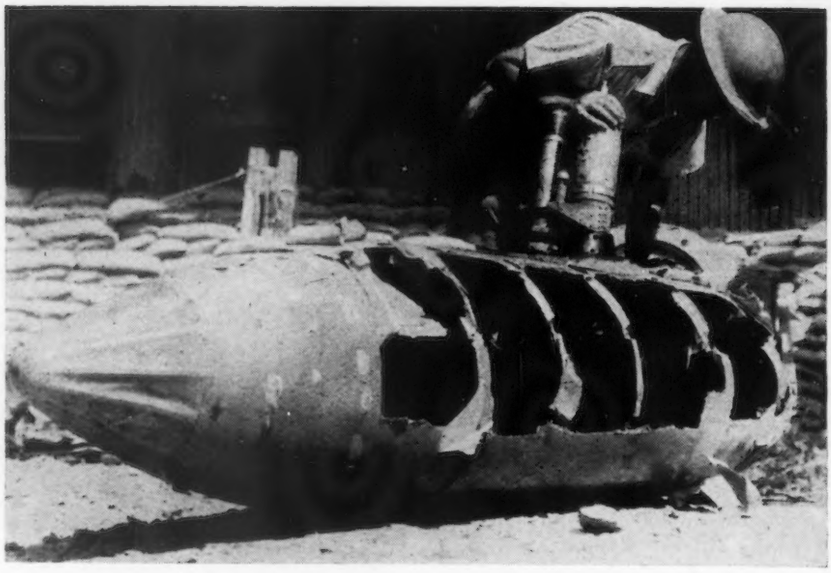
• • • **Restrictions** on the use of copper and zinc in lithography, photo-engraving and electrotyping, have been issued by G. C. Bateman, Canadian Metals Controller. Permits are required for the purchase of zinc, and users must make periodic reports on the amount of metal used, purchases and stocks on hand. Lithographers will be restricted to 75 per cent of the average amount of zinc used in the period 1937 to 1940, photo engravers to the copper and zinc used in the same period. The new regulations allow the purchase of scrap copper as a substitute for solid anode copper. Sale or transfer of quota copper or zinc without permission is prohibited.

•

Furniture Metal Curtailed

Toronto

• • • **Department of Munitions** and Supply has announced that metal may no longer be used in manufacture of furniture parts in Canada without a permit from the Controller of Supplies. Stamped pulls for doors and drawers, casters, and small fastening hardware are exempt. The new order will prevent metal from being used for such things as bases for tables or restaurant stools.



International News Photo

JAP "BELLY TANK": This is a piece of Japanese flying equipment known as the "Belly Tank." It is used on Japanese fighting planes as an auxiliary gasoline tank, made so cheaply, of wood, that the pilot can release its dead weight once he has drained it of fuel. The picture was made somewhere in New Guinea.

Bowman Named WPB Field Chief, Region 12

• • • **The appointment** of A. E. Bowman, of Minneapolis, as director of War Production Board region No. 12, completed the naming of WPB field chiefs. Mr. Bowman, whose headquarters will be in Minneapolis, will supervise all WPB field offices in Minnesota, North Dakota, and South Dakota.

U. S. Steel Corp. Finishing Output Holds at 105.7%

• • • **United States Steel Corp.** subsidiaries have maintained, since Pearl Harbor, a finishing capacity rate of 105.7 per cent, according to a telegram to Donald M. Nelson from B. F. Fairless, corporation president. The corporation furnaces produced nearly twenty million tons of steel ingots and well over 11½ million tons of blast furnace iron, both all-time records.

American Bridge Sets Record

• • • **By erecting** 41,837 tons of structural steel last month, the erecting department of American Bridge Co. established a new all-time monthly record, it was announced July 27 by L. A. Paddock, president of the U. S. Steel subsidiary. The new mark represents a 47 per cent increase over the department's best previous record established during October, 1930.

Reich Outlaws Building Improvements

• • • **The Reich Minister** of Labor has ordered German building owners to forego improving buildings for the duration, according to Radio Berlin. "All upkeep not absolutely necessary is to be postponed," the German radio said.

Japanese Aircraft Type Names

• • • **Much confusion has been caused by the Japanese habit of numbering their aeroplanes according to the year of their design. Hitherto this confusion has been worse confounded by the absence of authenticated type designations to give some distinction between different aeroplanes designed by the same firm in one year.**

The following list has been confirmed by *Aeroplane* as accurate and in use by the Japanese Air Forces. It goes a long way toward clearing confusion:

TYPE	JAPANESE NAME	JAPANESE SYMBOL
Ambulance	Byoinki	B
Army Co-operation	Rikugun Kyoryoku	RK
Dive-bomber	Kyukoki	K
Fighter	Sentoki	S
Float Seaplane	Suijo Hikoki	SH
Flying-boat	Hikosen	H
Heavy Bomber	Omoshi Bakudanki	OB
Light Bomber	Karui Bakudanki	KB
Reconnaissance	Teisatsuki	T
Reconnaissance Floatplane	Kaijo Teisatsuki	KT
Torpedo-bomber	Gyoraiki	G
Trainer	Kyorenki	K
Transport	Yusoki	Y

Steel Heads Warn of Danger But Comply With WLB Order

Washington

• • • **Because of war** conditions the companies involved have advised the War Labor Board that they will accept its order in the "Little Steel" decision. The Inland Steel Co., which was denied a request to postpone the effective date, July 26, announced that it would test the board's power to impose union security, called for by the order in connection with making contracts with CIO's United Steelworkers Union.

In a letter of July 25 to the board, however, Inland accepted the decision. Acting "under duress," however, said an Inland statement and "in the name of patriotism compelled to do a thing which it believes to be wrong," the company announced that it had accepted the so-called union security and wage increase provisions without comment. But Inland reserved the right to seek a court test on the order's provisions for the maintenance of membership and the checkoff.

The Inland statement, signed by President Wilfred Sykes and Board Chairman Edward L. Ryerson, said the company was complying with the order on the union security issue because Inland is unwilling to take the risk that non-compliance would precipitate interference by the union with essential war production. Regarding the maintenance of membership and the check-off provisions, the company said it had been advised that they violate the National Labor Relations Act, the Indiana Anti-Injunction Act and the Indiana Wage Assignment Law.

The Bethlehem Steel Co., the Republic Steel Corp., and the Youngstown Sheet & Tube Co. said that they would comply but that they did so under protest and would have taken the case to the courts in ordinary times.

President E. G. Grace of Bethlehem, though accepting the decision, said that it is still the company's opinion, as expressed in a statement to the board on July 1, that the board's orders "ignore the basic principles upon which our government was founded and the results of them will be harmful to our national economy and to the war effort." The Bethlehem statement added that the demand for a wage increase had a direct bearing on the cost of living and the threat of inflation, and the demand for a union shop or compulsory maintenance of union membership "involves the principle of freedom of employment." Mr. Grace proceeded to quote instructions from the board in which it was said that any attempt to stay the carrying out of the decision "must be construed by the board as a challenge to the war powers of the President."

In the light of these statements, Mr. Grace told the board, "we must regard the above mentioned directive orders of your board as being the orders of the President."

President R. J. Wysor of Republic said that the management of the company is unanimous in believing that the decision is unsound and constitutes a serious threat to the whole national economy.

"In normal times the company would exercise its right to appeal to the courts to test the legality of your directive orders," said Mr. Wysor. "However, these are not normal times. Such legal step, regardless of its merit, might seriously interfere with Republic's all-out war production."

Republic, however, pointed out what it said were serious dangers and inequities in the decision.

"Since steel is the country's basic industry, the wage increase awarded by you probably will run like wildfire throughout every other industry and every part of the country," Mr. Wysor said.

"In these war times when sacrifices are being urged upon every American, when 5500 of Republic's employees are in the armed services, the theory that wage earners or any other group are entitled to maintain their peacetime living standards as of Jan. 1, 1941, is fantastic."

The directive granting maintenance of union membership was denounced as being destructive of the fundamental right of every Republic employee to be free at

U. S. BLOCK BOMB: These two-tonners have been in process of experimentation since the early 1920's by the U. S. Ordnance Department and have been in production for many months.

Rapid Driving • No Slipping • Better Holding = 50% Less Assembly Time with Phillips Screws

Here's the formula for doubling fastening schedules: Replace slow-driving slotted screws and awkward hand-driving methods with Phillips Recessed Head Screws and pneumatic or electric drivers. Phillips screw and driver fit as one, making easier, fumble-free driving with no danger of driver slipping from recess to mar surface or cause injuries.

Slotted screw bottlenecks — crooked screws — split heads — burrs — all the slotted screw headaches that waste so much time and effort are eliminated. Work goes smoothly when you replace snail-paced slotted screws with lightning-fast Phillips screws.

You'll discover you get 2 hours work done in one — with a 50% saving in *cost* as well.

Contact companies listed below for further facts.

PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

all times to join or not to join, to remain a member of, or to resign from, any organization. It was stated that there are many workmen in Republic's plants who sincerely do not wish to join any union.

"It is common knowledge that threats, intimidation and violence have been used by the union to bring members into its fold," said Mr. Wysor. He expressed fear lest these tactics will be used to bring all of Republic's employees into the union and that to do so will prove detrimental to the company's war production.

The checkoff was declared to be strictly a union function and should not be forced upon the company against its will.

"There is no more justification for directing the company to collect union dues than there is for directing the union to collect the company's bills."

President Frank Purnell of the Youngstown Sheet & Tube Co., told the board that the decision was accepted under protest. The company also had requested a stay of the maintenance of union membership clause so as to allow a court test of the board's authority to order union security and the checkoff. Mr. Purnell said, however, that as an alternative the company would submit to the maintenance clause. The board's decision was declared to be "contrary to the nation's best interests" but Mr. Purnell said that the company would comply "because of our supreme desire to do anything and everything which the federal government believes will contribute to its efforts toward winning a complete victory over the enemies of this country."

Meanwhile the United Steel Workers of America (CIO) continues to press for an extension of the 44-c. daily increase, by going after U. S. Steel Corp. with demands including the following:

A general upward revision in wages of 5½c. an hr.

Minimum daily guarantee of the individual employee's occupational hourly rate.

Check-off of union dues and maintenance of membership.

Grievance machinery must be simplified.

Provision for elimination of all inequalities which now prevail within a plant, between plants of the same company and within the industry.

Union participation in all wage-making.

Continuation of contract termination by 10-day written notice.

Weirton Grants Workers Wage Boost of 44c. per Day

Weirton, W. Va.

• • • **The Weirton Independent Union** has closed an agreement with Weirton Steel Co. to accept a wage increase of 44c. a day, thereby following the pattern set down in the "Little Steel" case. In announcing the decision, the Weirton Steel Co. pointed out that pay for salaried employees, about 100 workers, would be increased 5 per cent. The wage increases will be retroactive to Jan. 1, indicating that employees will receive some $900,000 in back wages. On a monthly basis, the salary increase means an addition to the company's payroll of $110,000. Hourly workers at the same time have been guaranteed a minimum daily wage of $6.24.

Other Firms Follow Suit

Youngstown

• • • **As predicted,** the recent 44 cents a day wage increase for the Little Steel workers has forced many concerns in this area to match the raise, and already nine Youngstown companies have done so. These include: Youngstown Steel Door, Youngstown Foundry & Machine, William B. Pollock Co., Commercial Shearing & Stamping, McKay Machine, Youngstown Welding & Engineering, Cold Metal Process Co., Falcon Bronze Co., General Fireproofing, and MacKenzie Muffler.

"Remember, the 500 pounder goes on No. 212A Kölnstrasse; avoid at all costs the Swiss Consulate at No. 216."—Aeroplane.

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ROUND . . . FLAT . . . SHAPED

A FEW WIRES TYPICAL OF ROEBLING'S BROAD SPECIALTY PRODUCTION

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FLAT WIRE TO SPECIFICATIONS

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FIELD WIRE FOR SIGNAL CORPS COMMUNICATIONS

WIRE FOR THE "BACKBONE" of Signal Corps communications meets demanding specifications! This Roebling wire is stranded with other non-ferrous wire into telephone conductors that carry orders to the front, and reports back. In its manufacture, Roebling meets rigid specifications for analysis, tensile strength. dimensions and galvanizing.

Are your round, flat or shaped wire requirements in this "tough" class? If so, put the job up to Roebling! We have the skill, experience, and facilities to help you "beat the quota." Prompt action on war orders.

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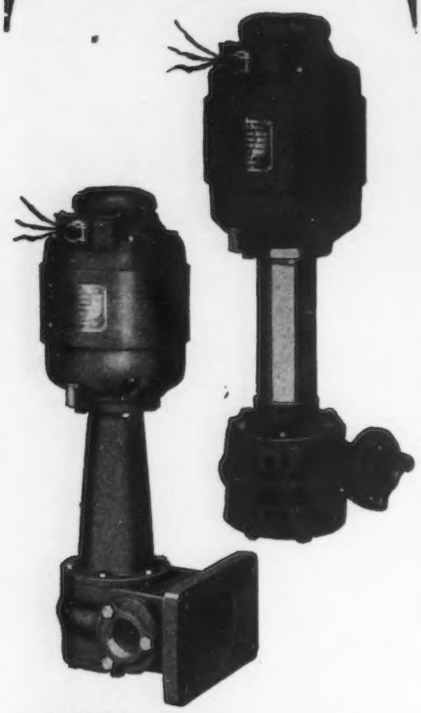
GUSHER COOLANT PUMP



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Don't let the steady flow of defense work in your plant be tied up by a tardy machine tool. Insure the satisfactory and continuous functioning of your machines by using Ruthman Gusher Coolant Pumps.

They really do a good job—so much so that they are now standard equipment on many well-known machine tools. Therefore specify Ruthman Coolant Pumps—the pumps that keep your cutting tools young.

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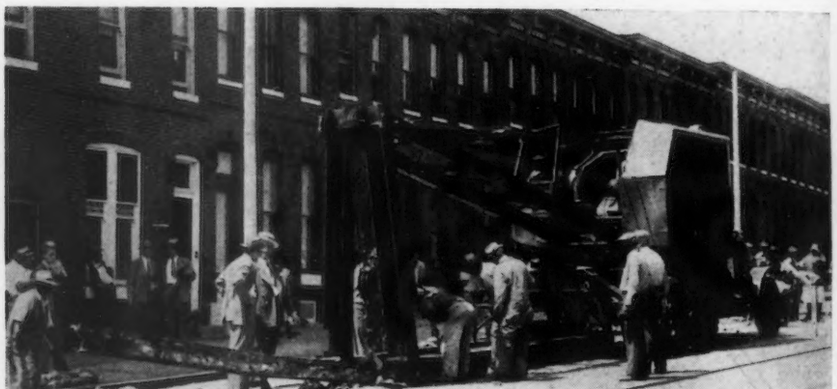

A-FRAME RAIL REMOVER: Heavy I-beams support an A-frame and hold pavement in place in the Victory rail remover, a commercial development. It is shown here at work in Baltimore. This machine, with a well trained crew, is said to be capable of pulling up 4000 lineal feet of rail a day.

Mechanical Rail Removers Speed Salvage of Car Rails

• • • **As scrapping** of buried street car rails increases under the impetus of the steel salvage drive a number of new devices are being developed to expedite rail removal. All are designed to do the job faster with a smaller labor force, and with less destruction of the surrounding pavement than has formerly been the case.

One of the first of these devices to come to public attention was illustrated in THE IRON AGE, June 11, 1942, p. 98. This rig, which was developed in an Asheville, N. C., machine shop, employs two heavy I-beams laid on either side of the rail. They serve to hold the pavement in place and support a frame fitted with sheaves. Over these sheaves the winch of an accompanying tractor hauls a cable which raises the embedded rail in a vertical direction. This unit is said to be capable of removing 25 tons of buried rail a day.

In Grosse Pointe Farms, Mich., Village Engineer M. M. Smith has worked out the device shown in an accompanying illustration. Mr. Smith's set-up uses three crews, one to remove the concrete around the rail; a second to operate the remover; and a third crew to repave the street. On the basis of experience in removing 12,000 ft. of double track he asserts that with proper planning and careful control, the rail removal and replacement can be accomplished coincident with producing a more up-to-date paved surface—paying the cost of the repaving out of the value of the rails sold. WPA labor was used on the project.

Six air-operated concrete breakers were used to trench along both sides of the rail, leaving each rail in an 18-in. wide trench. From these trenches the rail was removed by sliding a loop of heavy logging chain under the exposed end and alternatively lifting and sliding the looped chain under the rail in 6- or 8-ft. bights. The lifting and sliding operation was done by a LeTourneau road ripper from which the logging chain was hung. A caterpillar diesel tractor powered the road ripper.

To finish the job, the third crew mixed the broken concrete with a bituminous binder, raked the mix into the trenches to a height of 2 or 3 in. above the top of the pavement, let it stand for several hours and then compacted it with a roller.

In this, as in all mechanical rail removers, steel tie bars must be cut. The rail itself, if it is T-shaped, can be broken to proper lengths by burning one of the bottom flanges and striking the top with a sledge.

Removal of 60,000 tons of rail, practically all of it embedded in concrete and asphalt, will be started soon in New Jersey. Work is ex-

pected to begin in Camden, using a type of rail remover now doing a successful job in Baltimore. This machine is a patented product of the Victory Rail Remover Corp., with eastern offices in the Lincoln-Liberty Building, Philadelphia. It is used on a lease basis, with the company supplying trained operating personnel.

The Victory remover will pull up 4000 lineal feet of rail a day after the crew has become familiar with the job in hand, the company states. No claim is advanced on the subject of paying for the cost of removal and re-paving with the scrap value of the rail.

This unit, like that at Asheville, uses heavy I-beams as a foundation to prevent disruption of more pavement than is necessary to remove the rail itself. On top of the I-beams, as the accompanying illustration shows, there is a large A-frame. As the winch pulls the cable over a block and tackle hung from this frame the lifting force is counteracted by the I-beams which serve to hold the paving in place. A pair of tongs which grips the rail is slid along as the latter is pulled out. The I-beams and the entire rig are in turn moved down the street by the truck to which they are attached.

Further extension of the use of mechanical rail removers may be expected in the near future if the MRC follows its practice of acquiring title to embedded rail, as it has done in New Jersey.

ROAD RIPPER: A logging chain suspended from a road ripper is the method devised to remove rails embedded in the concrete streets of Grosse Pointe Farms, Mich. A follow-up crew mixes the broken concrete with a bituminous binder and repaves the street.

OUT for MORE THREADS

The Collapsible Tap illustrated is a new design of universal type. With the handle you can use it as a stationary tap on turret lathes and hand screw machines. Without the handle it becomes a rotating tap for drill presses or tapping machines.

The non-rotating Self-Opening Die Head uses the same chasers as do the rotating types so that you can produce more threads with a nominal investment in tool equipment.

From every production viewpoint Murchey Threading Tools are out for more threads.

Murchey
MACHINE & TOOL CO.
Detroit Michigan

Army-Navy Labor Policy for Munitions Plants Announced

• • • **Under-Secretary of War** Robert P. Patterson and Assistant Secretary of the Navy Ralph A. Bard on July 18 announced the Army and Navy labor policy for government - owned, privately - operated plants. Affecting nearly 100 large munitions plants, it was evolved over a period of months in collaboration with representatives of organized labor.

The policy guarantees that no employee or person seeking employment shall be discriminated against by reason of race, color, creed or sex. It provides for the orderly selection of a bargaining agent after a majority of the estimated number of employees in any appropriate unit has been hired. It sets up procedures in establishing wage scales, handling grievances, protecting plants against sabotage, and guaranteeing the rights of discharged employees.

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Equipment for
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At your Service . . . the country's leading practical plating engineers.
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German Industrialists To Run Super-Steel Cartel

• • • **Great significance** is believed to attach to the organization of the whole German iron and steel industry into one all-embracing Imperial Iron and Steel Association. Not only are the foundries, blast furnaces and steel works included, but also the ore trade and the big iron and steel merchants. The association is to be given the job of carrying out on its own responsibility the war-time tasks given to it by the government.

The association will have widespread powers of self-administration under state supervision, and it is considered in some quarters in Germany that its continuance into peace-time might be desirable. It is not only a super-corporation but also a super-cartel. For the time being at least, even the research and experimental laboratories of the industry come within its aegis.

The association's immediate tasks are to: Draw up and supervise plans for production, raw materials supply, imports and exports; develop and introduce new technical processes; plan and distribute raw and auxiliary materials, fuel and scrap, *without any regard to existing distribution schedules;* plan routes for raw materials, fuel, scrap and rolled steel; regulate markets for members' products and conclude market regulating agreements; deal with price questions; settle questions of interest as between members; supervise and safeguard measures relating to control of iron and steel, particularly statistics, and, finally, simplify syndicate conditions.

By using its own initiative and responsibility it is believed in German quarters that the industry will be able to achieve new record outputs. The association will be able to over-ride all existing arrangements regarding supplies of raw materials, deliveries, sales territories, etc.

The authorities are anxious to remove all uncertainty on responsibility, and the chairman of the new group will work under the supervision of the Ministry of Economics, with a tie-in with the Ministry of Munitions. All traditional difficulties, and new ones occurring through the new organization of the market, which might stand in the way of production are thus removed.

DO NOT DISTURB: SH-h-h! With hundreds of men and women working on the night shifts on war production, Allis-Chalmers Mfg. Co. is helping safeguard their sleep during the day. The poster is placed in the window to serve as a warning to be quiet in the neighborhood.

Offset Plane Described In German Broadcast

• • • **Further details** of the Blohm und Voss Bv 141 single engine unsymmetrical monoplane were recently picked up from a German broadcast originating at Zeesen, which claimed that it had been used successfully on the Eastern Front in some numbers.

A view of this craft appeared in THE IRON AGE, June 25. The ship is said to have a 1660 hp. engine of the BMW 801 type mounted on the port wing in the nose of a long nacelle which carries the half tailplane. The enclosed-cabin nacelle is carried on the starboard wing. It has accommodations for a crew of three. Armament is believed to include two cannon and two movable machine guns firing forward and one in the tail cone turret.

A claim is that it is "very fast and has great maneuverability as well as a fast climb." If the motor is as represented, rough calculations would suggest that top speed is about 290 miles per hr, at 17,000 ft.

The Bv 141 is designed chiefly for tactical purposes and is said to have been in quantity production for some months at a new plant in eastern Germany.

Canadian Car Gets Order For 1000 Dive Bombers

• • • **Department of Munitions** and Supply announced that the Canadian Car & Foundry Co., has recived a contract for more than 1000 dive bombers, to cost $60,000,000, to be constructed at the company's Fort William, Ont., plant. This order will keep the plant in continuous operation until late in 1944.

Price Advances Seem Modest, Says Report of OPA

• • • **OPA recently** said that there had been only an 11 per cent increase in metal and metal product prices between August, 1939, and April, 1942. OPA further said that as of April 18, 92 per cent of all metals and metal products were under price control. Raw materials during the same period increased 50 per cent.

moving materials **FASTER**... at lower cost
with the **MERCURY** "Trackless Train"

Where loads are heavy and the haul is long the Mercury "Trackless Train" is your best bet for efficient, low cost handling.

The motive unit is separate and can work continuously, never standing idle to be loaded or unloaded. The train is not confined to fixed path, but may go anywhere that movement necessitates. Trailers can be exactly suited to the materials to be moved and material movement can be systematized to tie in with production schedules.

The tractor illustrated is the Mercury "Tug" Electric, Model A-540, the trailers are the popular Mercury "A-310." Gas tractors are also available where required. The "Banty" for congested areas and where conditions are not too severe, the "Huskie" and "Super Huskie" for heavy duty operation.

For the complete story on the Mercury "Trackless Train," write for illustrated literature.

MERCURY MANUFACTURING COMPANY

TRACTORS
TRAILERS
LIFT TRUCKS

4144 S. Halsted Street, Chicago, Illinois

Five Ohio Seamless Veterans Rewarded for Long Service

• • • **Five workers** who participated in the making of the first seamless tubing in America at the plant of Ohio Seamless Tubing Co. here are still active. At a recent ceremony, they were presented gold watches by W. C. Connelly, president of Ohio Seamless.

All five workers have seen service on the same site where they started 50 years ago.

New York Contract Branch Operating Under New Name

• • • **Announcement** of the change in name of the New York district Contract Distribution Branch, WPB, to the Production Service Department, WPB, was made July 22 by Sydney Hogerton, regional deputy director in charge of operations. Reeves L. Kennedy had been appointed regional manager of the Production Service Department.

KEEP IN STEP WITH OUR FIGHTING FORCES

● With an Army on the offense—all men and all units must advance according to plan. The same is true in the production of essential war machines and materiel. All steps must be synchronized for maximum output.

Alloy castings—whether pots, boxes, retorts,—muffles, tubes, rails, rolls, shafts,—can do their part for you in maintaining your production objective—if you can count on them for uniformly high heat-hour service.

MICHIANA has concentrated all effort for 24 years in the specialized field of heat- and corrosion-resistant alloy castings. MICHIANA Alloys have made performance records in a wide field of application. MICHIANA has the experience, the facilities, and skill to take care of your needs and help toward maintaining the quality and amount of your output.

MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana

- Muffles
- Boxes
- Rails
- Rolls
- Retorts
- Pots
- Grids
- Tubes

MICHIANA
Heat-Resistant and Corrosion-Resistant ALLOY CASTINGS

- Sprockets
- Chains
- Heat-Resistant and Corrosion-Resistant Castings of All Kinds

Thousand Miles of Railroad Track Requisitioned by WPB

• • • **Nearly 1000 miles** of abandoned and non-essential railroad track, including rails, switches, fastenings, and other track equipment have been taken over for war use during the past six months by exercise of the requisitioning authority of the War Production Board, the Inventory and Requisitioning Branch announced July 23. Including sidings, spurs and miscellaneous track-side equipment taken over, it is probable that approximately 200,000 tons of iron and steel products were made available.

Gondola Shortage Hampers Hanna Furnace Corp. Plant

Buffalo

• • • **An acute shortage** of railroad gondolas temporarily tied up deliveries of pig iron at the Hanna Furnace Corp. plant here for five days but had eased up considerably July 27. The shortage of cars threatened to upset completely the allocation program to war industries and this was averted only at the last minute, plant officials reported. There is no guarantee that the situation may not recur any time.

B-13 Trainers Built of Plywood

Washington

• • • **By using wood,** the War Department has announced, about 600 lb. of strategic metals are being saved in the construction of a B-13 training plane. The process involves conversion to wood of the outer wing panels, flaps, ailerons, side panels, and the complete monocoque and empennage or tail section of the airplane. Metal is confined chiefly to fastening devices.

Plan Priorities on Workers

Buffalo

• • • **War industries soon** may have first call on all workers in this district, according to Richard C. Brockway, New York, state director of the U. S. Employment Service, who said curtailment of service to non-essential industry and priority to war plants is now under consideration.

Urgent Request for Heat Treating Data

• • • To expedite vital war production, the WPB is seeking all available heat treating facilities which can be used to break the bottleneck existing in this field.

Idle furnace capacity should be reported to the Heat Treating Equipment Unit, War Production Board, Room 4520, Social Security Building, Washington.

Critical Machine Tool Survey Is Great Aid to Production

• • • **A weekly survey** on the hours in which critical machine tools are available for war production has been made since April by Region 2 of the War Production Board and is gradually demonstrating its worth as an aid to war production, according to Reeves L. Kennedy, regional manager, Production Service Department, WPB.

"The critical tool survey," Mr. Kennedy said, "is helping us do a more efficient job of serving the Army, the Navy and the war manufacturers of the region. Through it we can trace down quickly idle critical machine tool capacity for those who need it for war work."

Mr. Kennedy revealed that according to the most recent survey, fifty-five critical tools in New York and northern New Jersey were idle some 589,000 hours. This figure was based on an ideal but rarely attainable schedule of 168 hours of operation and was without relation to the manpower supply. A supplementary survey made by the Region office indicated that there were approximately 115,000 hours of idle tools with operators readily available.

Each week summaries of the available machine hours are compiled in the New York region. Similar weekly surveys are made by WPB regional offices in Boston, Philadelphia, Chicago, Cleveland and are being developed in Denver, Kansas City, and Minneapolis. Copies of the summaries are circulated between regional offices and are sent to procurement officers and to various Washington agencies.

First Two Individual Awards Announced

• • • **The first two** War Production Drive awards of Individual Production Merit, given for what has been termed "America's secret weapon"—the ideas of men in the plants, were announced today.

The labor-management committee in the Busch-Sulzer Bros. Diesel Engine Co., plant at St. Louis, conferred the awards upon Clarence H. Howdeshell and Milton Carr.

Baltimore Gets First War Manpower Branch

• • • **First** of the War Manpower Commission's field offices scheduled for critical labor supply areas was opened recently in Baltimore, it was announced by Chairman Paul V. McNutt.

A. A. Liveright of Chicago, a member of the staff of the director of operations, War Manpower Commission, has been named director of the Baltimore office.

New
PERMAFLECTOR FLOODLIGHTS
FOR More PRODUCTION
FOR More PROTECTION
★ Permaflector, the silver mirrored glass reflector which provides engineered light control, from extreme concentration to extra broad spread!

Combat sabotage! Maintain 24-hour production with New enclosed Permaflector Floodlights • Quality-built of spun steel. Rugged. Weather-proof, will withstand heat, cold, rain, snow! • Specially finished to resist corrosion • In 4 Wattages, 3 Light Distributions – concentrated, broad and intermediate • Complete • Ready to install • Quickly, easily mounted on horizontal or vertical surface, or 2" pipe • Adjustable to almost any position • Ideal for all outdoor floodlighting • Write for literature, prices!

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410 OLIVER BLDG. - PITTSBURGH, PA.

Tear Off

Clip to letterhead Sign Mail for complete information, prices.

On ★ The War Front

ABOVE

WHY NAZIS FLY HIGH: A wirelessed picture from Moscow showing a Russian anti-aircraft crew firing shells at enemy night bombers with the quadruple-barrelled machine-guns familiarly known to British naval A.A. gun crews as "Chicago pianos."

o o o

RIGHT

PREPARING FOR A RAID: R.A.F. armorers checking over the bombs before they are loaded into Stirling aircraft. This is just one bomb-load for one bomber out of the hundreds now taking part in the R.A.F.'s master bombing plan.

LEFT

CAPTURED GERMAN GUN: General Paget, commander of British home forces, watches a twin German "Solitherns" machine-gun from a captured German plane being demonstrated.

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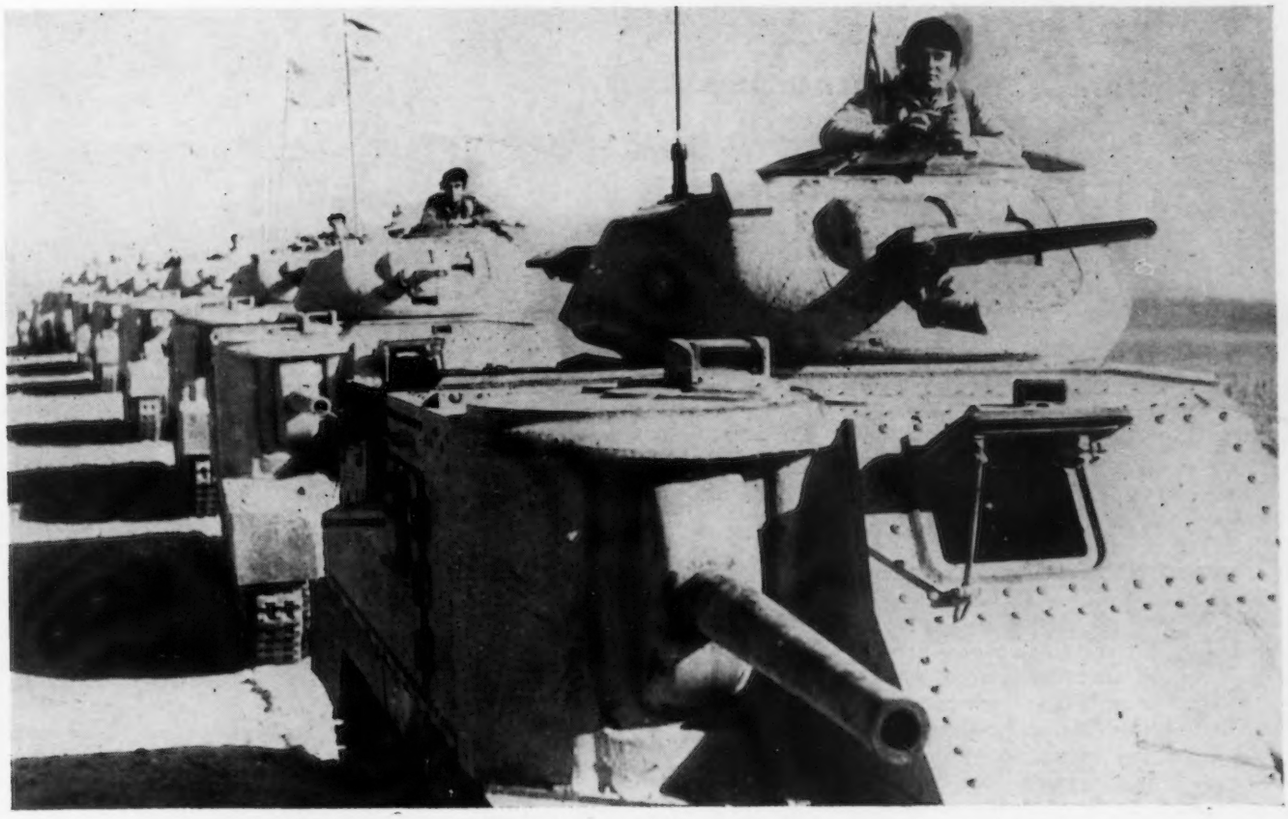
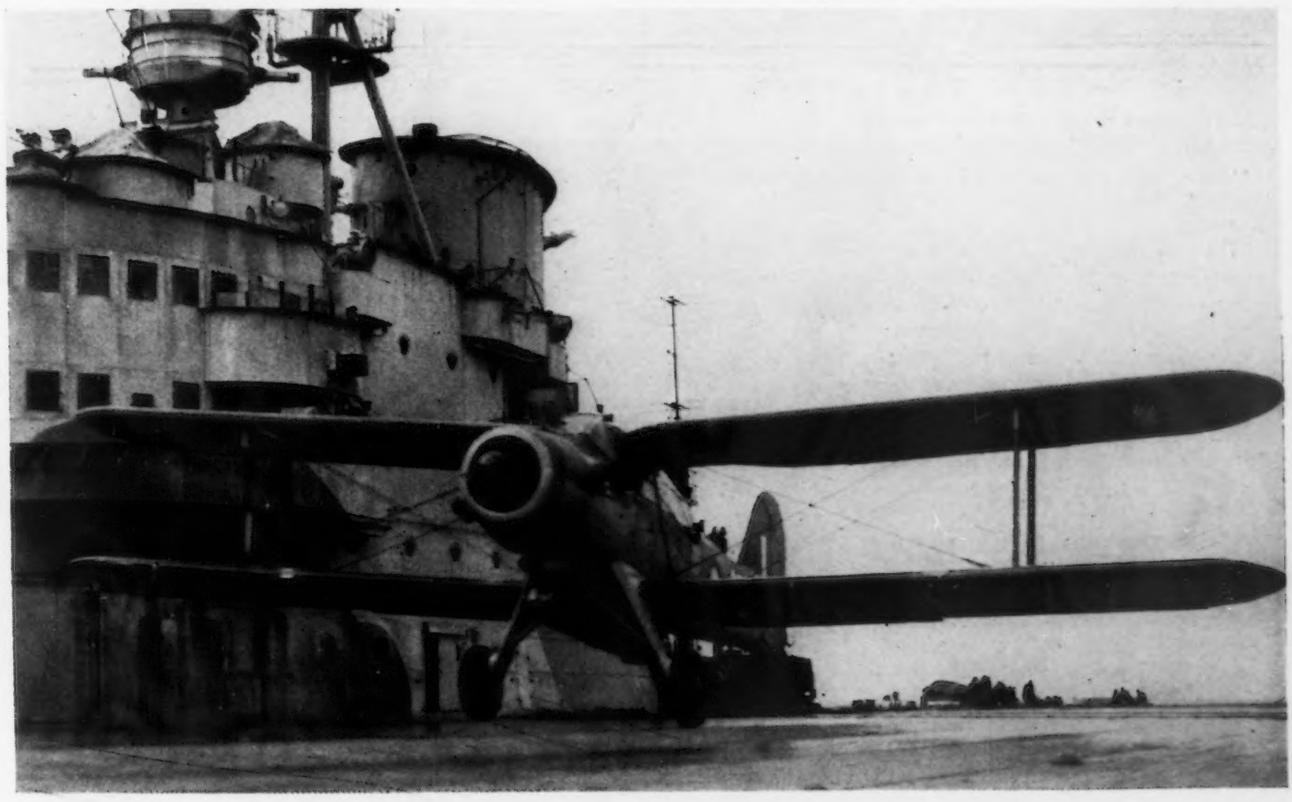


ABOVE

AMERICAN TANKS IN DESERT: Photo shows General Grant tanks lined up for moving into battle in the western desert. These tanks have been engaging the enemy at the battle of Knightsbridge.

BELOW

BRITISH FLEET ON WAR SERVICE: A torpedo carrying Albacore taking off from the flight deck of a British aircraft carrier.



Air-Conditioned Blast Furnaces Win Favor With 19 Units in Operation

By G. F. SULLIVAN

New York

• • • **For each ton** of pig iron tapped from a blast furnace, approximately 1.75 tons of ore, 0.9 tons of coke and 0.4 tons of limestone go up the skipway, and 3.8 tons of air is blown in the tuyeres. The raw materials—ore, fuel and flux—going up the skip have long been controlled, sized and blended with great and esoteric skill, but the idea of tampering with the 3.8 tons of air blown in has been kicked around for many a decade.

Several things could be done to bring the air variable under control. Each ton of air is made up of some 1550 lb. of nitrogen (which goes along for the ride, and contributes little to the reduction process), about 600 lb. of oxygen (which does all the work), and anywhere from 50 to 100 lb. of water vapor, depending on the humidity (a small part of which is involved in the reduction process, the remainder being in general detrimental). Two things could be done to the air, namely:

(1) Remove some of the moisture, or, more important, maintain constant moisture content of the blast at a fairly low level. This is called dry-blast, or air conditioning.

(2) Use of oxygen enriched blast, thereby speeding reactions in the furnace, and cutting down of the volume of inert nitrogen passing through the furnace.

The mechanism of oxygen enrichment is still so expensive and complicated as to move adoption of this practice into the far future. On the other hand, dry blast equipment and practice are each day becoming better known and more confidently accepted. The history has, however, been checkered and even today the subject encounters considerable debate.

Today, there are 19 furnaces on dry blast in this country, most of them put into operation over the past year. These installations, their location, and the dry-blast system used, are as follows:

Three furnaces, Woodward Iron Co., Birmingham, Carrier system.

Two furnaces, Jones & Laughlin Steel Corp., one Aliquippa stack and one Eliza (Pittsburgh) stack, Carrier system.

Three furnaces, Sloss Sheffield Steel & Iron Co., Birmingham, one home-made system using converted stove, and 2 Carrier units.

One furnace, American Rolling Mill Co., Ashland, Ky., Kathabar system.

Two furnaces, Republic Steel Corp., one York system, at Birmingham and one Kathabar system at Gasden.

Four furnaces, Bethlehem Steel Co., Sparrows Point, Md., Carrier system.

One furnace, Globe Iron Co., Jackson, O., Trane system.

One furnace, Inland Steel Co., Chicago, Trane system.

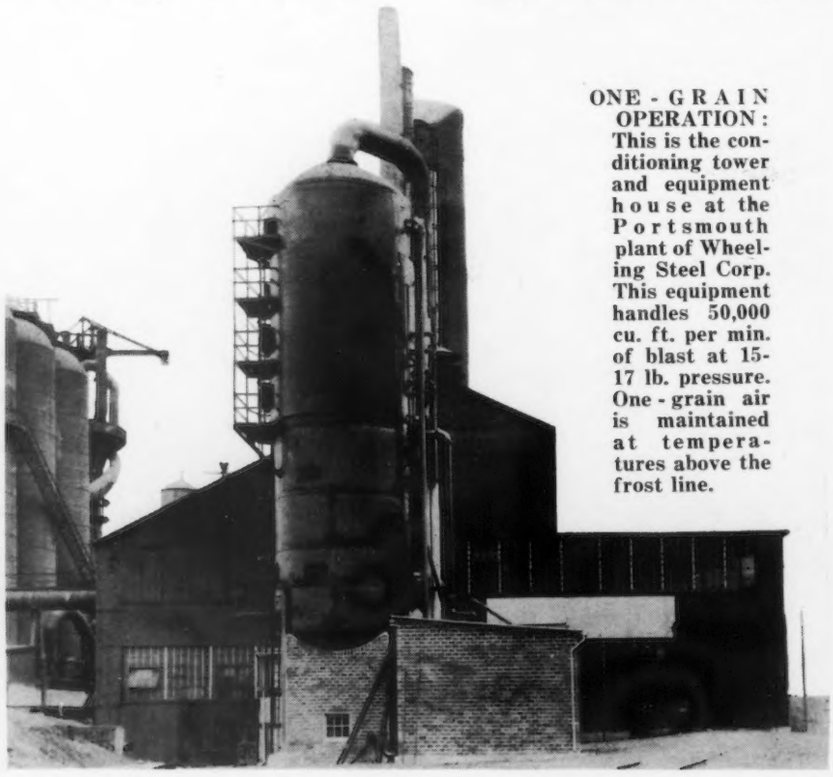
One furnace, Wheeling Steel Co., Portsmouth, O., Trane system.

It will be noticed that there are four systems of moisture control being used: The Carrier system made by Carrier Corp., Syracuse, N. Y.; the York system, made by York Ice Machinery Corp., York, Pa.; the Kathabar system, made by Surface Combustion Corp., Toledo, O., and the Trane system, made by the Trane Co., La Crosse, Wis.

Carrier did a great deal of exploratory and development work several years ago, and the first modern furnace to be air-conditioned (the Woodward stack, see THE IRON AGE, July 20, 1939), used the Carrier system. York came into the picture shortly thereafter, and Trane is enjoying considerable popularity at the present time even though it is a relative newcomer in the blast furnace field. Kathabar (Katherine & Barbara; names of the inventor's daughters) equipment is quite common in the comfort field, for several years has been installed in a number of foundry cupolas, but only over the past year has pointed toward the blast furnace field.

Carrier and York use a standard refrigeration system and deliver air containing 3 grains of moisture per cu. ft. Trane is a regenerative system of the after-compression type; the Wheeling and Inland units are 1-grain plants, whereas the Globe equipment was installed as a 3-grain system but actually is operating at 2 grains. The Kathabar system controls humidity independent of the air temperature by means of Kathene, which is essentially lithium chloride and acts as an absorption medium; moisture content can be dropped to 1 grain per cu. ft.

There is considerable argument



ONE-GRAIN OPERATION: This is the conditioning tower and equipment house at the Portsmouth plant of Wheeling Steel Corp. This equipment handles 50,000 cu. ft. per min. of blast at 15-17 lb. pressure. One-grain air is maintained at temperatures above the frost line.

Here's the Way to Do the Internal Grinding of TUNGSTEN STEEL Cartridge Dies

These NORTON DIAMOND WHEELS *are the Answer*

Rapid Production

Close Dimensional Accuracy

High Surface Finish

FOR ROUGHING—Norton 100S-B100 Diamond Resinoid

Grinds cartridge dies of dense, wear-resistant alloy steels such as tungsten at a rapid rate, many times faster than ordinary vitrified wheels. Wheel wear is so slight that hole size and straightness can be held to close tolerances without difficulty.

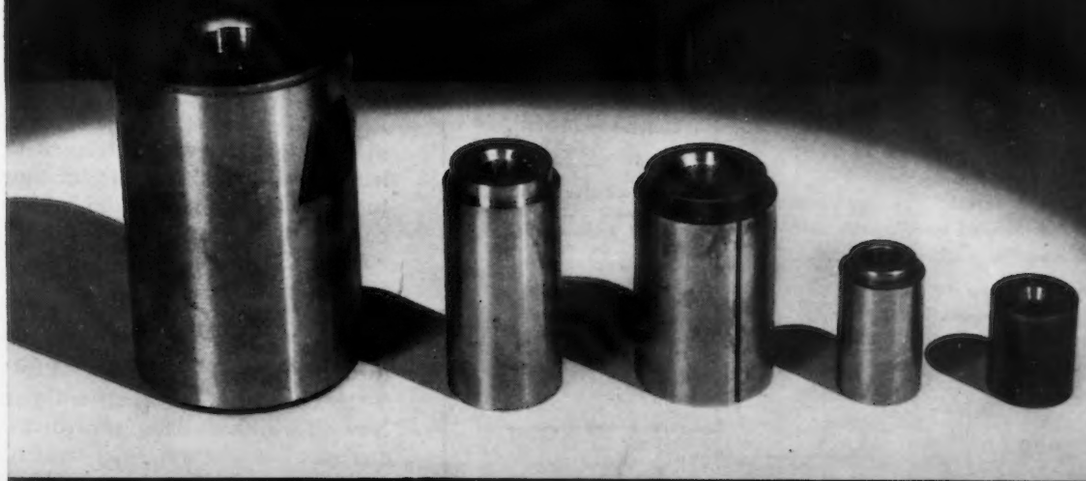
FOR FINISHING—Norton 500-B50 Diamond Resinoid

Produces a surface finish comparable to that obtained by lapping and in a fraction of the time.

If you are making tungsten steel cartridge dies it will pay you to consider Norton Diamond Wheels for the internal grinding job. Consult your Norton abrasive engineer.

NORTON COMPANY, WORCESTER, MASS.

W-883

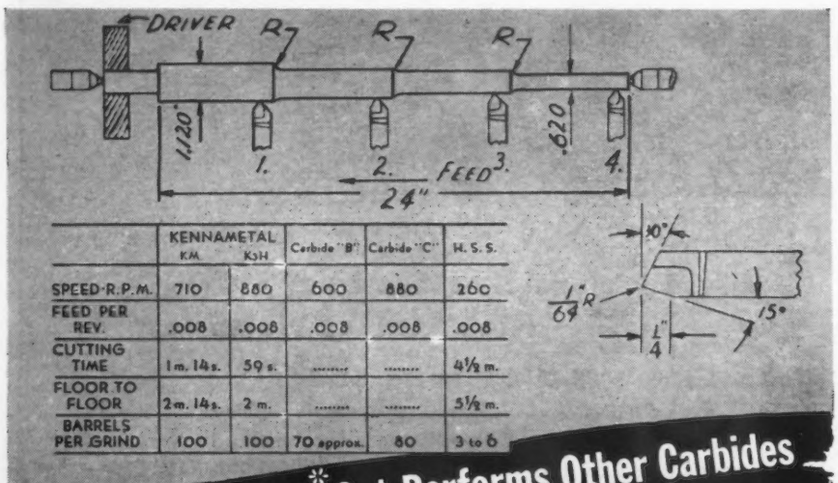


NORTON ABRASIVES

at present among blast furnace operators as to what is the optimum moisture content of the air to the blast to be maintained with a dry blast system. At the present time the majority of plants in which the blast is conditioned maintain a moisture content of 3 grains per cu. ft. All the published data and information to date giving the results of operation with dry blast have been on the basis of 3-grain operation. While there is much theoretical discussion in favor of dehumidifying the blast down to less than 3 grains, as low as 1 grain, to date this discussion has been a great deal theoretical, and while several plants have been installed to operate to produce 1-grain moisture content, so far there have been no published results of actual operation of blast furnaces at 1 grain to prove the advantages, if any, of 1-grain moisture content over 3-grain.

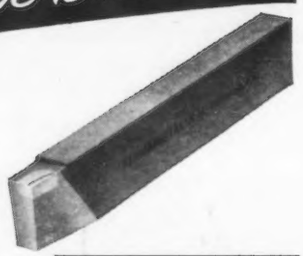
The actual gains in production as shown by results from 3-grain systems in actual operation are considerably above any theoretical gains that can be calculated. The only explanation of this so far advanced, is that due to the uniformity of operation possible with uniform blast conditions because the last major variable in its operation has been eliminated, the furnace can be operated at its peak continuously. Hence, since the major gain of uniformity is already accomplished by use of a 3-grain system, many operators believe that the only possible additional gain by going to a 1-grain system is the insignificant theoretical gain that can be calculated between the two. None the less some furnaces desire a 1-grain system just in case events encourage going to that low level.

James Gayley, in 1904, conducted the first large-scale dry-blast experiments in the United States. He reduced the moisture from 5.66 grains to 1.75 grains per cu. ft., and he raised his iron output about 10 per cent and dropped coke consumption about 12 per cent. His equipment, however, was costly and the scheme fell into disfavor. In 1939, Woodward put in modern and more efficient Carrier equipment and immediately reported 10 per cent or more gain in production, with additional advantages in less off-grade iron and constant, smooth furnace operation. Jones & Laughlin has been extremely laudatory as to the results obtained. There has, none the less, been perhaps a rather regrettable tendency in the industry to view these results as exceptions or almost as spurious. This viewpoint, however, is changing. Many in the industry are waiting for reports from Bethlehem and Inland, and preliminary indications are that these will be sufficiently favorable to create a rush for dry-blast on anywhere from 20 to 50 additional stacks.



	KENNAMETAL KM	KSH	Carbide "B"	Carbide "C"	H. S. S.
SPEED R.P.M.	710	880	600	880	260
FEED PER REV.	.008	.008	.008	.008	.008
CUTTING TIME	1 m. 14 s.	59 s.	.....	.....	4½ m.
FLOOR TO FLOOR	2 m. 14 s.	2 m.	.....	.....	5½ m.
BARRELS PER GRIND	100	100	70 approx.	80	3 to 6

KENNAMETAL* Out-Performs Other Carbides in Machining Rifle Barrels



• In this set-up for finish turning rifle barrels, tools Nos. 1, 2 and 3 turn the radii as they are fed along the barrel. Each tool moves transversely and independently of the others, but all are carried in a common tool block carrier.

As indicated in the table KENNAMETAL tools finished 100 pieces per grind, as compared to 70 and 80 pieces for ordinary carbides, and 3 to 6 pieces for high speed steel. In addition, KENNAMETAL tools did the work more quickly, and were in better condition after work was completed.

All of these points add up to the fact that KENNAMETAL is more economical, in the long run, than any other material for machining steels. Similar superior performances are proving this every day in hundreds of plants.

How To Take Care of KENNAMETAL Change Tools Regularly

Be sure you check tool wear carefully, so that tools can be changed before overwear. Over-dulling destroys accuracy of work and reduces the number of grinds possible during the life of the tool. Save time and tools by regular sharpening.

KENNAMETAL THE All American CARBIDE

* Invented and Manufactured in U. S. A.

McKENNA METALS Co.
144 LLOYD AVE., LATROBE, PENNA.
Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York (Exclusive of Canada and Great Britain)

Coke Plant Planned for China

• • • **The Otto Construction Corp.,** New York, has been awarded a contract for a complete by-product coke oven plant, to be built in China. The by-product installation will include equipment for the recovery of benzol and toluol, and a tar distillation plant.

Super-Ratings From AAA Down to Replace Many Allocation Directives of WPB

Washington

• • • **The WPB Iron and Steel** Branch has canceled from 700 to 800 allocation directives, and in their place will be substituted the super-ratings, ranging from AAA down to A-1-a, provided for by Priorities Regulation No. 12. The cancellation was made as the iron and steel industry prepares to come under the Production Requirements Plan. Beginning with September there will be no more unrated allocation orders on the mills. Even plates and pig iron, which have heretofore been directed, must now be ordered with the super ratings. The Army and Navy Munitions Board, however, has the authority to approve all PD-25-a applications, A-1-a and above, from the standpoint of urgency or other pressing reasons.

The higher ratings will not be applied during August so that directives which are already on schedules or in the process of rolling will remain in effect. Rerating has been instituted to give certain strategic materials a clear track.

Amory Houghton, Director General for Operations, last Thursday took occasion to spike rumors to the effect that the PRP plan would be scrapped for the fourth quarter, as he announced the issuance of the revised PRP application form PD-25-a. Trade opinion seems to be that PRP cannot possibly work because it has inherent in it the same faults and failures as the priority system.

All manufacturers who are required to obtain priority assistance under PRP will receive the new PD-25-a form by mail, and must file it not later than Aug. 10, WPB has said.

Mr. Houghton also pointed out that the fourth quarter application forms have been designed in accordance with the definitely established policy of WPB to make the PRP plan the primary instrument of the priorities system.

Manufacturers whose metal requirements are less than $5,000 worth at present will not be required to file PD-25-a, but soon a "Little PRP" patterned after the present plan and the old form PD-25-x will be issued to users of small amounts of metal.

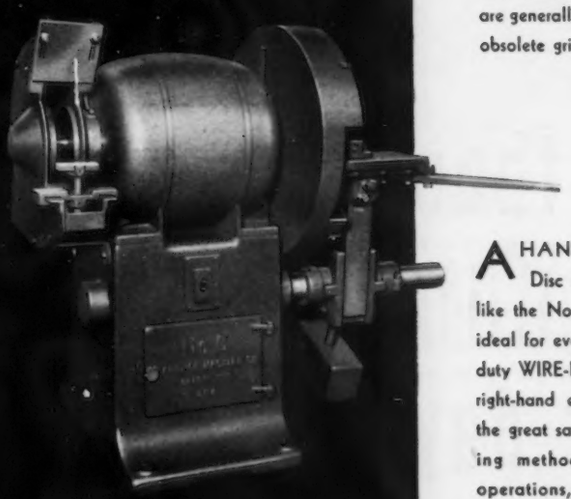
Questions which might arise prior to Aug. 10 in connection with the definition of a manufacturer's products should be addressed to the Bureau of Census, Reference CMR, Washington, D. C.

The new PD-25-a, changed in a number of important respects, serves as the basis on which the Requirements Committee will determine total requirements for the fourth quarter by industries. It is also the manufacturer's application to WPB for preference rating assistance in buying authorized quantities of critical materials.

The Allocation Classification System which WPB had previously announced would become a part of the PD-25-a in the fourth quarter will not be mandatory because sufficient information has not yet been accumulated by all applicants under PRP.

One of the most important

2 handy tools in 1—
in this COMBINATION GARDNER GRINDER!



No. 6 GARDNER GRINDER WITH 26" DISC WHEEL AND 24"x3" EMERY WHEEL

MANY shops encounter a fair number of flat surfacing operations, but have heretofore felt that the volume on this work alone, did not warrant the installation of a Disc Grinder.

At the same time, these shops normally have a good many snagging jobs, which are generally handled on some old, half-obsolete grinding stand.

A HANDY Gardner Combination Disc and Emery Wheel Grinder, like the No. 6 machine shown here, is ideal for every such plant. The heavy-duty WIRE-LOKT Abrasive Disc on the right-hand end, enables you to effect the great savings over ordinary machining methods on many flat surface operations, which have characterized GARDNER-GRINDING for 35 years, while the emery wheel end of the machine takes care of a host of snagging jobs.

Built in several sizes and types — for every metal-working shop!

WRITE TODAY FOR FULL DETAILS!

GARDNER MACHINE COMPANY
412 East Gardner Street, Beloit, Wisconsin, U. S. A.

changes in the form lies in the fact that section B of the new form includes much of the information in regard to shipments formerly required by Section D, which is eliminated.

In submitting this information, however, the manufacturer, except when he has used or is using top ratings, no longer has to list separately his shipments according to each preference rating. For example, instead of listing his actual shipments on each rating from A-1-b to A-1-k, he now lists them all under one heading A-1-b through A-1-k. This is said to have been ordered because WPB will squeeze all of the strategic materials into the super-rating bracket.

One change in the form is for the purpose of giving WPB more recent inventory figures. Another is the printing on the form of the metals section of the Materials List. A third is the elimination of Section E and F supplement and the inclusion of that information in Section E.

Manufacturers may now state requirements up to four quarters in advance in a new section added to the form. The number of advance quarters that can be authorized will depend on the nature of the product, its importance to the war effort, and the volume of unfilled rated orders on hand.

WPB is now in the process of preparing a PD-25-a processing directive which will assign various preference ratings to iron and steel products. And perhaps it may not be made public, according to one WPB official.

PD-25-a processing directives take the place of the old "P" orders but so far have not been issued for every industry covered by the "P" orders. None have been made public to date because the submission of PD-25-a for the third quarter itself may make the WPB Requirements Committee revise all of the directives issued thus far.

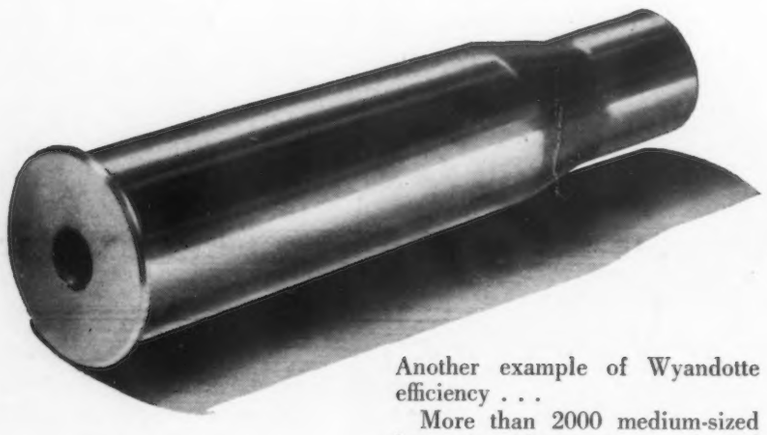
•

Canada Uses PRP

• • • **WPB announced** on July 22 that Canadian companies had been put on the same basis as American companies insofar as the board's classification of the "end use" of their products is concerned. Hereafter, no distinction will be made between the purchaser's symbol of a Canadian and an American firm. Placing Canada on the same basis as the United States was done through an amendment to the general instructions governing the Allocation Classification system.

The first of the five purchasers' symbols, USA, will now include the Canadian Army and Air Force as well as the United States Army. The symbol USN now includes the Canadian Navy, Trafalgar Shipbuilding Co., Ltd., and Wartime Merchant Shipping, Ltd., as well as the United States Navy and the Maritime Commission. Lend-Lease (LL) and other Foreign Purchasers (FP) remain the same, but Domestic Purchasers now include purchases for use within Canada.

In furnishing the information called for by the Allocation Classification System, Canadian companies are required to use the same symbols as the corresponding American companies.



more than 50,000 per day

Another example of Wyandotte efficiency . . .

More than 2000 medium-sized brass cartridge cases are cleaned every hour between draws and before stress relief on full automatic production line.

Power washing machines (two-compartment washers) do the trick.

A special Wyandotte Alkaline Cleaner is used in each of the first compartments and a specialized Wyandotte Liquid Compound in the second, to prevent verdigris formation between operations.

Fatty Acid Drawing Compounds are economically removed.

A Wyandotte Field Engineer's suggestions were followed in setting up this production line. Wyandotte men are solving hundreds of war production cleaning problems, regardless of the equipment.

We are ready to help you with your problems.

Wyandotte PRODUCTS

SERVICE REPRESENTATIVES IN 88 CITIES

THE J. B. FORD SALES COMPANY • WYANDOTTE, MICHIGAN

In an amendment to Priorities Regulation No. 10, long-term purchasers were granted a one month's extension of the date on which they must notify their suppliers of the symbols to be placed on the purchase orders. Through the amendment the Office of Operations now rules that on orders placed before July 1 the purchaser will have until Aug. 30 to notify his supplier of the symbols.

In certain industries such as copper and alloy steel, the work of coding orders is well advanced and the information thus conveyed is necessary to allocate these materials properly. Buyers of these materials are urged to complete work on the old orders as early as possible so that the information may be used in scheduling deliveries.

•

Material Weights

• • • **Government agencies** engaged in war procurement are forbidden to require weighing of materials which would lead to backhauling or cross-switching, by WPB Directive No. 6. The new directive provides that in all such cases, contracts shall authorize weight determination by estimate, sampling, or some other method which will not involve carrying materials an unnecessary additional mileage. Procurement agencies are also directed to modify existing contracts to conform to the established policy, so far as is practicable.

•

4th Quarter PRP

• • • **All manufacturers** operating under PRP must file the revised PD-25-a with WPB not later than August 10 to obtain such assistance for the fourth quarter, according to the Director General for Operations. The new form was released by WPB this week, and its return by August 10 will permit WPB for the first time to process individual applications with the full knowledge of the overall supplies and requirements picture. In addition, the elimination of form PD-275 and the simplification of PD-25-a make it easier for the manufacturer to meet the deadline.

Manufacturers now operating under PRP will receive forms PD-25-a through the mail, and are urged not to write to WPB inquiring about the return of applications as it will take until September to completely examine the applications.

•

PRP Authorizations

• • • **To speed** authorization of critical raw materials to companies operating under the PRP during the fourth quarter, a Supplementary Material Information sheet, use of which is optional, has been added to the revised form PD-25-a, WPB announced. In issuing the sheet it was pointed out that in the past authorization of critical materials was often delayed to make sure that such authorization would not conflict with any conservation or limitation orders. The new sheet eliminates this delay by providing a stand-

COKE OVEN EQUIPMENT

QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

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The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

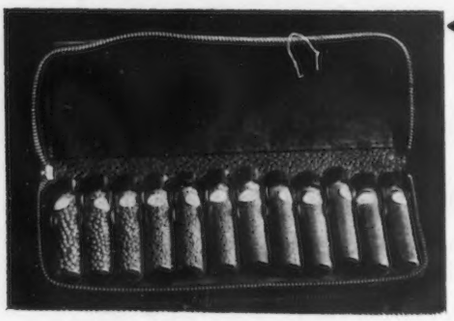
1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

MASS PRODUCTION
OF WELDED PIECES

Where quantities of similar pieces are to be welded, time savings range up to 50% and beyond when Ransome Positioners are used.

The T-slotted table top is first jigged-up and the welder is then prepared to weld one piece after another with little lost time in changing pieces, less rod waste, better welds and more production. Write for complete information.

INDUSTRIAL DIVISION
RANSOME CONCRETE MACHINERY COMPANY
DUNELLEN NEW JERSEY



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

•

HARRISON ABRASIVE CORPORATION
Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

ardized form in which the manufacturer may give additional information on certain critical materials.

•

Warehouse Shipments

• • • **Although amendment** No. 6 to order M-21-b, issued July 23, prohibits warehouses from shipping orders rated lower than A-1-a, exceptions are made for some categories and for maintenance and repair parts. Shipments in any quarter must not exceed these percentages of the total quarterly quota: Stainless, 3; tool steel, 3; other alloys, 3; and all other steel or iron products, 5. Flat rolled products below prime grade may be delivered down to A-3; and cast iron soil pipe larger than 4-in. down to A-10. Steel roofing, small pipe, fence posts and certain wire products may still be delivered on unrated orders. Oil well casing, pipe and tubing are exempted from the provisions of this amendment.

•

Oil Cans

• • • **Can manufacturers** were notified by WPB in an amendment to order M-21-b, issued July 23, stocks of terneplate on hand as of Feb. 11 for the making of cans for lubricating oil in 1 qt. and 5 qt., or larger sizes. However, WPB said that no cans for packing lubricating oil made of terneplate or any other metal can be manufactured, sold, or used after Sept. 30. The amendment also limits canners' terneplate quota for packing lubricating oil during the period July 23 to Sept. 30 to 10 per cent of the area of tinplate, terneplate, and blackplate which was required for the manufacture of cans made of such material and used for this purpose during 1940.

•

PD-25-a Supplemental Form

• • • **To facilitate** authorization of critical raw materials to companies operating under the Production Requirements Plan during the fourth quarter, a Supplementary Material Information sheet, use of which is optional, has been added to the revised form PD-25-a. In the past, authorization of critical materials to a PRP unit often has been delayed in order to make sure that such

authorization would not contravene any conservation or limitation order.

The new sheet eliminates this delay by providing a standardized form in which the manufacturer may give additional information on certain critical materials.

More Steps in Revamping Of WPB Are Announced

Washington

• • • **A further step** toward completing reorganization of WPB was announced on Tuesday by Amory Houghton, WPB director general for operations.

C. H. Mathiessen, who has been chief of the Bureau of Priorities, has been named assistant director general for operations. His duties will be interchangable with those of Mr. Houghton. A. I. Henderson, former director of the materials division, has been made deputy director general for industry operations, with control over industry, materials, construction, inventory and requisitioning, and technical service branches and the bureau of governmental requirements. Mr. Henderson will be assisted by John R. Kimberly and H. W. Dodge.

The existing industry and commodity branches will continue to be the principal operation units. However, plans for regrouping them for administrative purposes are being developed with former divisional lines eliminated. The working of all industry and materials branches will be coordinated in this single organization.

J. A. Krug, previously in charge of the power branch, has been appointed deputy director for priorities control. He will take over the several branches of the Bureau of Priorities except for inventory and requisitioning and the internal operations group.

Wade T. Childress, who has been WPB regional director in Kansas City, has been named deputy director general for field operations.

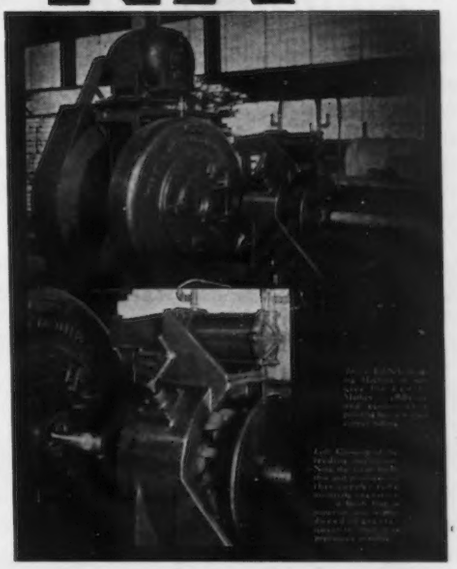
C-I Furnace Blown Out

Chicago

• • • **The No. 4 blast** furnace of the Gary works of Carnegie-Illinois Steel Corp. was taken out of blast on July 26 for repairs. The corporation has 22 out of 23 furnaces in blast in this area.

LEWIN-MATHES *Got the right answer at*

ETNA



They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

WE PUT THE KIDS
TO BED IN 1865!
Atop the roof of the Dunbar spring plant is perched a bell... summoning the workers in the morning... sending them home at night. This bell also performs a community service... for, rung 99 times at nine in the evening, it sends all children home and to bed. The bell still rings... the tradition almost forgotten. But the tradition of fine workmanship still goes on in the hands of another generation of spring-makers, whose talents are actively engaged in helping to meet the crisis of 1942.
1865
SINCE 1845
1942
Dunbar Bros. Co., Bristol, Connecticut
DIVISION OF ASSOCIATED SPRING CORPORATION

Price Adjustment Permits Abandoned Under Order 136

• • • **Manufacturers** of machinery under government and lend-lease contracts and subcontracts will not need to obtain temporary permits in order to charge higher prices pending decision on applications for price relief.

This change is made in amendment No. 1 to Maximum Price Regulation No. 136, as amended, which covers most machines and parts and machinery services.

The procedure for holders of government and lend-lease contracts and subcontracts to obtain higher maximum prices is governed by Procedural Regulation No. 6, which will now apply uniformly to all manufacturers. Upon the filing of an application for adjustment and pending the issuance of an order by the OPA granting or denying the application, contracts or subcontracts may be entered into, and deliveries may be made at the price requested in the application, subject to the possibility that refunds may later be required.

Another change in Regulation No. 136, as amended, is that second-hand machines or parts are now defined simply as those which have been "used." The additional category of machines "purchased for use" has been abandoned on the ground that this test might work hardships. Accordingly, sales of machines which have been purchased for "use" but never "used" are no longer governed by the provisions for second-hand machinery.

In another change in the regulation, manufacturers of mica capacitors will now operate under a March 31, 1942, base date, instead of Oct. 1, 1941.

The amendment postpones until Sept. 1, 1942, the operation of Maximum Price Regulation No. 136, as amended, in its application to sales and deliveries of electric storage batteries.

Minor changes are made in the lists which define the coverage of the regulation. "Gears, pinions, sprockets, and speed reducers" have been eliminated in the expectation that Price Schedule No. 105 will shortly be amended to cover those items at all levels of distribution. "Electrical wire, cable, and cable accessories" have been removed from Appendix A, which lists those items for which the Oct. 1, 1941, price base date is applicable. By a new amendment to Price Schedule No. 82, that order will now cover distributors as well as manufacturers of wire and cable. Those few items in the wire and cable field which are not covered by Schedule 82 remains in Regulation 136, but carry a March 31, 1942, base date.

Various items have been added to Appendix B. It will now list pole line hardware and line construction specialties, automotive testing and maintenance equipment, glass insulators and power cylinders.

The amendment also clarifies the maximum price provisions for jobbers of machinery in those cases where items had no list prices in effect on the base date. If the same item was sold on or about the base date, no more than the same markup may be added to the current invoiced cost.

While repair and maintenance services on construction and road maintenance equipment are still included in Regulation 136, OPA announced that these services would shortly be covered under Maximum Price Regulation No. 134 by an amendment to that regulation in the near future.

KITTYBOMBER: Curtiss Kittyhawk single-seat fighters with a bomb attached underneath the center section of the fuselage. Such an improvised fighter-bomber has been employed effectively in Libya. The British have used their famous Hurricane as a Hurrybomber in the same theater, and the Germans have frequently used the same technique over Britain for the past year.

•

Wide Changes Made in Reinforcing Bar Schedule

• • • **Fabricators** of concrete reinforcing bars will not be required to file reports of transactions and inventories with OPA as was originally provided in Maximum Price Regulation No. 159. Amendment No. 1 to Regulation No. 159, effective July 28, makes the following important changes:

1. The provision requiring each fabricator to file, by July 15, 1942, a detailed inventory statement as of June 1, 1942, together with a list of all purchases and sales in the month of June, 1942, and each quarter year thereafter, is eliminated.

2. The procedure for determining maximum prices for mill and random stock lengths is simplified.

3. Adjustable pricing, originally prohibited in the regulation, now is permitted subject to maximum prices in effect at time of delivery.

4. Provisions covering the segregation of bars for pricing and invoicing have been simplified.

An important change has been made in regard to the determination of maximum prices for mill and random stock lengths. Originally the regulation provided a $2.15 base price per hundred pounds for sales of such lengths sold in carload quantities. Amendment No. 1 provides for a $2.15 base price for mill and random stock lengths in carload quantities on any sale only where such lengths exceed 25 per cent by weight of the total quantity sold. In any case in which less than 25 per cent of a sale is specified and available in these lengths and which is primarily an engineering job, the $2.40 base price for the whole order appears to OPA to be fair and equitable and in line with accepted industry practice. Purchasers will not be required to certify to the non-acceptability of mill lengths or random stock lengths.

• • • **In regard** to the adjustable pricing provisions of Amendment No. 1, the OPA said:

"Section 1306.363 of the regulation as originally issued prohibited adjustable pricing—that is, an offer or agreement to adjust prices to a price not in excess of the maximum price in effect at the time of delivery. However, since Revised Price Schedule No. 6 (iron and steel products) permits adjustable pricing by the mills on the sale of concrete reinforcing bars to the fabricator, it appears equitable to permit this privilege to the fabricators even though no increase whatsoever is contemplated in ceiling prices."

In another change affected by the amendment, the provisions covering the

segregation of bars for pricing and invoicing have been revised to eliminate "the burdensome computation of trucking costs," since the trucking charge is an arbitrary charge which has long been customary in the industry. The amendment also clarifies the provision to permit the invoicing by the fabricator on less-than-carload shipments of the excess of the less-than-carload rate over the carload rate from the mill to the fabricator.

In order to conform more closely to established industry practices, certain changes were made in the maximum prices for shipments to Michigan and in switching charges and truck transportation charges. Also square-cut ends were included in the schedule of allowable extras at the same rate as milled ends, and the extra for listing was limited to cases where no engineering extra is charged for detailing and placing plans.

•

Ores, Concentrates Defined

• • • **An amendment** defining ores and ore concentrates, sales of which are exempted from the General Maximum Price Regulation, was announced July 25 by Price Administrator L. Henderson.

The measure—Amendment No. 17 to the General Maximum Price Regulation—becomes effective July 30

"For the purposes of the regulation, ores are any mineral substance used chiefly as a commercial source of metal contained therein," said the Price Administrator. "Ore concentrates are any ore, as defined in the amendment, after the removal of the gangue, or a part of the nonmetallic elements, either by a physical or chemical process."

This definition was issued to remove any uncertainty as to the meaning of "domestic ores and ore concentrates" as used in the regulation. It incorporates in the regulation the definition which has been consistently applied to these terms by the OPA.

•

Amendment on Copper

• • • **An amendment** to make clear that maximum prices which may be charged on sales of copper in carload lots are applicable to all other sellers as well as to refiners and producers has been made to Revised Price Schedule No. 15 on copper, Price Administrator Leon Henderson announced July 27.

For sales of copper in carload lots, the price schedule provides a maximum price of 12c. a pound, Connecticut Valley base.

For sales in less-than-carload lots, refiners and producers are granted permission to charge 12⅛c. per pound f.o.b. refinery. Sellers other than refiners or producers on sales of less-than-carload lots may add to delivered costs premiums ranging from ¾ to 2c. a pound the amounts dependent upon the size of the shipment.

The foregoing prices are applicable to all copper other than casting copper.

The clarifying amendment—Amendment No. 2 to Revised Price Schedule No. 15—becomes effective July 31, 1942.

LAST VACUUM CLEANER: Albert D'Amours and Bertha Kulig recently attached the handle to the last vacuum cleaner produced at the East Springfield works of Westinghouse Electric & Mfg. Co. before the production facilities were utilized for war work.

•

Drive on to Cut Profits

• • • **A new drive** to renegotiate war contracts and pare profits was inaugurated last week when the War Department established price adjustment sections in the procurement district offices of the supply services and the material command of the air forces.

The new sections will call in contractors and embark on renegotiations. Continuous contact will be maintained and it will be unnecessary for manufacturers to go to Washington. The adjustment units will be directed in policy by the War Department Price Adjustment Board which is administered by Col. Albert J. Browning.

So far, the War department has succeeded in reducing profits by some $585,000,000.

•

Core Oil Exempted

• • • **Core oil** has been exempted from provisions of the General Maximum Price Regulation, under Amendment No. 17 to Supplementary Regulation No. 1 to GMPR, effective July 27.

•

Wage Issue Near Climax

• • • **The wage control issue,** foremost factor in the problem of price control, appeared to be moving swiftly toward a climax this week. President Roosevelt was weighing two choices—one calling for wage control through exercise of his broad powers, and the second being the passage of legislation prepared by OPA which would in effect freeze wages but permit adjustment.

•

Salvage Firms Exempted

• • • **Sales of** six salvage companies, three of them New York City concerns, were excluded by OPA from the provisions of GMPR. The companies have registered and qualified with OPA as engaged primarily in the reconditioning and sales of damaged commodities received in direct connection with the adjustment of losses from insurance companies. S. A. Wald & Co., Inc., of 154 Maiden Lane; Albert R. Lee & Co., Inc., of 90 John Street, and the Universal Salvage and Testing Company of 22 West Twenty-sixth Street are the three New York companies included in the order.

•

Exception on Pig Iron

Washington

• • • **The Pittsburgh** Ferromanganese Co., Pittsburgh, has been granted an exception by OPA and authorized to sell pig iron at its leased Chester, Pa., furnace at $2.25 a ton, all basing points, over the fixed price. The furnace is running on basic iron, for which the OPA ceiling price is $24.50. The Chester prices were made subject to the switching charges and differentials set forth in the pig iron schedule.

The exception was granted because of the high producing costs of the Chester furnace.

New Setup Devised on Quota Assignments

Washington

• • • **The WPB** Iron and Steel Branch Steel Distribution Committee, headed by Joseph L. Block, has recently set up a procedure which it will follow with the cooperation of the industry in fixing quota assignments of various products.

This procedure cancels the prior practice of scheduling ingots in accordance with priority ratings as production directives to be issued will supersede all allocations and priorities and define the actual supply of each steel product. Within the production directive, orders will be scheduled in accordance with Priorities Regulation No. 1 as to allocation, priorities, etc. Such products as plates, which are completely allocated, will be handled as heretofore within the production directives established for each producer.

It will be the function of each unit of the Iron and Steel Branch Products Section to see that each producer is given high-rated tonnages to apply against his production directive for each product. This will be done by continuous check up with each of the producers to determine their priority position and the transference of orders as may be necessary from producers having heavy backlogs of high-rated orders to those which have lighter commitments.

The procedure set up by the committee in planning overall steel directives by products for each company which produces steel ingots and more than one steel product is as follows:

In meeting with qualified representatives of the various companies, product distribution is determined by weighing allocations and directives already issued to a particular company, and other commitments for the war program which it has; overall demand for each product as indicated by reports in possession of the Steel Distribution Committee and the determinations of the WPB Requirements Committee; and such additional information regarding operating conditions, etc., as the company representatives submit to the committee.

If a producer has two or more plants in the same district, a directive is prepared including the plants in the same district, but otherwise, an overall directive is then prepared for each plant of the producer.

These directives specify the minimum monthly tonnage of each product which is to be produced and shipped. The total tonnage of all products in the overall directive is limited to 95 per cent of the average shipment from the plant or district in recent months. Total produced in excess of the minimums directed is to be distributed among the products in accordance with Priorities Regulation No. 1.

For larger companies whose operations are more complicated and diversified, a tentative rather than actual distribution is initially prepared. After the preparation of this directive, the procedure is as follows:

(1) The company representatives are asked to take the proposed directive back to their plants and check its practicability, after which they are to advise the Steel Distribution Committee regarding any changes which they believe necessary.

(2) Simultaneously, copies of the proposed directive are sent to all WPB Iron and Steel Branch Unit Heads for their criticism and suggestions.

(3) The Steel Distribution Committee reviews the suggestions of the company representatives, and the suggestions of the unit heads and determines on the actual directive, which is then issude to the company by the WPB Director General for Operations, effective for a month thereafter until changed.

The Steel Distribution Committee believes that the quota assignment system will enable producers to plan their operations with some assurance of stability which will in turn provide a better utilization of labor and give the men steadier employment.

•

Experts Summoned

Pittsburgh

• • • **As Washington** moved a step nearer to the institution of its "quota" system, steel companies in this area received telegrams to send production men to Washington this week with all necessary data regarding production and capacity of their plants. Meanwhile, report has it that one Midwestern steel company is already operating under the quota system. On the other hand, with these conferences scheduled for the latter part of this week, steel circles here doubted that the quota system could be instituted upon the entire industry for the month of August.

WPB Seizes French Aircraft Forgings for Remelting

Washington

• • • **Approximately** 800 tons of French airplane engine forgings not usable in American engines will be routed to electric furnaces as the result of a recent WPB seizure, it was announced Saturday. The forgings were ordered before the fall of France, and were not delivered.

The requisitioned material is of extremely high quality, more than half of it containing at least 3 per cent nickel.

Restricts Deliveries Of Steel Plates

Washington

• • • **By an amendment** to M-21-c on Monday, the WPB director general for operations restricted deliveries of iron and steel plates to ratings of A-1-k or higher.

Previously the order prohibited producers from making deliveries at lower ratings and the amendment prohibits others from doing so. Exceptions were made for deliveries by warehouses for maintenance and repair purposes; for the provisions of Regulation 13 and with special authorization by the director general.

A definition of alloy and stainless steel plates also was included in the order. When applied to alloy steel, except stainless, the term "plates" means flat hot rolled steel products, including skelp; over 12 in. wide and ¼ in. or more thick, or over 12 in. wide and weighing 10.2 lb. or more per square foot or over 48 in. wide and 3/16 in. or more thick or over 48 in. wide and weighing 7.65 lb. or more per square foot.

When applied to stainless steel the term "plates" means flat hot rolled steel products, including skelp, over 10 in. wide and 3/16 in. or more thick.

Bethlehem's Fairfield Yard Gets "M" Burgee

Washington

• • • **For bringing** down the average ship production time from keel laying to delivery into service to a record of 160.3 days in May, and for delivering in June 11 ships which averaged 99 days each for construction, the Bethlehem-Fairfield Shipyard was presented last Saturday with the "M" burgee and Victory Fleet flag by Rear Admiral Emory S. Land, Chairman of the Maritime Commission. Bethlehem-Fairfield is the first Atlantic coast shipyard to win the "M" award.

Admiral Land said that during the first World War, comparable ships were built in 10 to 12 months, and Maritime had set a time schedule of 6 months for present shipbuilders to produce ships.

The shipyard was nonexistent 15 months ago, but now with 15 ways takes up hundreds of acres.

This Week's Priorities And Prices

When there is a conflict between two orders bearing the same preference rating, the manufacturer is to base his delivery date on giving preference to the order received first. (T-601)

Canadian producers are placed in the same class as Americans in determining end use classifications. (WPB-1578)

Reconstruction of certain types of essential non-residential construction permitted in a liberalization of order L-41. (WPB-1574)

Non-ferrous and other critical materials entering into manufacture of officer's military insignia are restricted by order L-131. (WPB-1558)

Belting, hose, packing, press die pads, rubber lined tanks and similar items are further restricted by more stringent specifications in an amendment to order M-15-b-1. (T-600)

Domestic cooking appliance manufacturers who are permitted to operate after July 31 may figure allowed iron and steel consumption on a quarterly basis. (T-598)

Warehouses may ship maintenance and repair parts below A-1-a ratings, with certain limitations. Certain other items may also be shipped on lower ratings. (WPB-1579)

Sellers of copper, other than refiners and producers, may add to delivered costs premiums ranging from ¾ to 2c. per lb., depending on size of shipment, according to OPA revised price schedule No. 15.

New electric motors will be released only for the most important war and civilian requirements; other users will have to buy used motors. (T-618)

PRP units are required to file revised form PD-25-a by Aug. 10. (WPB-1572)

Balata may be used only in self-sealing aircraft fuel tanks. Exceptions granted by special authorization only. (T-619)

Silver ores, bullion, concentrates, etc., placed on restricted imports list. (WPB-1571)

■ ■ ■

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. *(**For example,** **WPB-600** **means announcement** **600** **issued by the War Production Board.**)*

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Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

Under "M Orders," page 6, add:

M-9-c-4...Forbids use of copper and alloys in building construction, except wiring (7-22-42).

M-15-b...Amendment No. 11 (7-25-42) permits consumption of Balata in manufacture of self-sealing gasoline tanks and for other specified uses.

M-15-b...Amendment No. 13 (7-25-42) removes limit on accumulations of stocks of reclaimed rubber in hands of reclaim consumers.

M-15-b-1...Amendment No. 9 (7-21-42) revises specifications for various rubber products.

M-15-b-1...Amendment No. 10 (7-21-42) revises specifications for rubber footwear.

M-15-b-1...Correction No. 1 (7-25-42) adjusts typographical errors in amendments Nos. 8 and 10.

M-21-b...Amendment No. 6 (7-23-42) permits steel warehouses to continue their function of filling emergency steel orders by setting standards of sale and purchase of steel.

M-63...Amendment No. 2 (7-21-42) forbids importation of silver except by special authorization. Related form, PD-222-a.

M-81-b...Prohibits use, sale, or manufacture of lubricating oil cans made of any metal after Sept. 30, 1942 (7-23-42).

M-136...Permits use of blackplate for cans for certain specified products (7-22-42). Related form: Canners' Certificate.

M-146...Amendment No. 1 (7-23-42) extends uses for quartz crystals, and removes requirement for a certification if purchaser is a U. S. or foreign government agency.

M-154...Amendment No. 1 (7-22-42) postpones scheduling of operations by thermoplastics manufacturers until Aug. 15.

M-191...Allocates lithium compounds starting Sept. 1 (7-17-42). Related forms: PD-585 and PD-586.

Under "P Orders," page 13, add:

P-46...Amended order permits utility companies to make extensions to facilities for the Army, Navy, or Maritime Commission upon direct order by them, but limits length of such extensions (7-23-42).

Under "L Orders," page 19, add:

L-1-e...Amendment No. 1 (7-24-42) permits manufacture between July 1 and Dec. 1 not more than 500 "off-the-highway" trucks for U. S., Canadian, and South American metal mines.

L-23-c...Amendment No. 2 (7-20-42) permits authorized cooking appliance manufacturers to figure allowed iron and steel consumption on a quarter basis.

L-41...Amendment No. 2 (7-23-42) eases restrictions on new construction projects. Related form: PD-200.

L-54-c...Amendment No. 1 (7-16-42) clarifies that production quotas for office machinery under the order do not include machinery not covered by distribution restrictions, and makes other changes. Related form: PD-423.

L-63...Exemptions No. 6 (7-22-42) permits wholesalers and distributors subject to terms of order to carry inventories representing a six-month supply of functional replacement parts for machinery and equipment.

L-131...Restricts use of critical material in manufacture of officer's military insignia (7-20-42).

L-143...Amendment No. 1 (7-23-42) permits construction, repair and delivery until Aug. 3, 1942, of tire manufacturing machinery and equipment.

L-154...Amendment No. 1 (7-24-42) to schedule I permits water meter manufacturer to use up to 60 per cent of their inventory of parts and material on hand July 1 in manufacture of meters.

Under "Priority Regulations," page 33, add:

No. 1...Interpretation No. 1 (7-21-42) clarifies that in event of identical ratings, the order placed first shall have preference even though the second order bears an earlier delivery date.

No. 10...Amendment No. 2 (7-22-42) places Canadian companies on the same basis as American companies insofar as the WPB allocation classification system and end use code of products is concerned.

Under "Miscellaneous Orders," page 33, add:

Directive No. 6...Forbids requiring material weighing which would lead to back-hauling or cross-switching.

Steel Advertising Criticized As Senate Inquiry Nears

• • • **Reflecting** a hostile attitude toward the steel industry, Senator Truman and Senator O'Mahoney, the latter of Wyoming, on Monday on the Senate floor seized upon the daily press advertising of different steel companies dealing chiefly with production records. Senator Truman said, "It is also most interesting to note—and I call the attention of the Senator to the fact that advertisements are being run now in the great metropolitan newspapers by various steel corporations, by the United States Steel Corp., and others of the steel group, explaining very explicitly how they have expanded steel production. I think one of the reasons for this hurry in the effort to build public opinion on their side of the controversy is that on the sixth day of August the committee of which the Senate has made me chairman will go into the whole steel program and find out exactly why we are short and why it is necessary to shut off the shipbuilding program because of a shortage of steel."

Senator O'Mahoney also fashioned a sinister purpose out of the steel advertising. He saw in the advertising, "Hidden purposes to influence the elections which are coming in November." The Wyoming Senator, who is hotly pushing the sponge iron process, specifically referred to United States Steel Corp. and Bethlehem Steel Co. advertising. He did not attempt to explain the so-called connection the advertising has with political motives.

Pig Iron Allocations Changed in Eastern Pa.

Philadelphia

• • • **Pig iron** suppliers report considerable changes in allocations in this area due to three elements in the supply picture. The district is now receiving basic pig from the old Delaware River furnace, and a Bethlehem furnace has been taken out for relining. It is scheduled to resume operations about Sept. 1. Substantial users of pig in the manufacture of bathtubs, soil pipe and stoves are no longer in the market.

THIS IS THE WAR OF THE WORKSHOP: Lieut. Carter Porter of the U. S. Army Air Corps congratulates Stanley Lamparski, a tube tester at the Brackenridge plant of Allegheny-Ludlum Steel Corp., on the part the men in the plant are doing in this war. Porter is touring the nation in the interest of war bond sales.

Jarvis Says Half Aluminum For War Must Be from Scrap

Buffalo

• • • **Shortages of iron** and steel scrap, rubber and many non-ferrous metals may prolong the war indefinitely, Ernest G. Jarvis, president of the Niagara Falls Smelting & Refining Corp., told several hundred industrial representatives here last week. To meet the President's production schedule for planes, guns and tanks, he said, will require 2,200,000,000 pounds of aluminum annually, "but only 1,000,000,000 pounds will be produced this year by the reduction process. The rest must be made up through the reclamation of scrap."

Federal Ship Honored

Kearny, N. J.

• • • **The new Army-Navy** Production Award for high achievement in the production of war equipment has been conferred upon the Federal Shipbuilding & Dry Dock Co., U. S. Steel subsidiary, L. H. Korndorff, company president, announced. The presentation will be arranged later.

Lend-Lease Tonnage Cut; Plate Output 1,150,000 Tons

Pittsburgh

• • • **The entire tonnage** to be produced by American steel mills for lend-lease was cut somewhere between 10 and 25 per cent recently.

The closest estimate received thus far on plate production for July is that it will total 1,150,000 tons. Moreover, along the lines of permitting mills to make up for a greatly reduced production of other items such as sheets, strip and bars, it is reported that the WPB is cutting August plate allocations by 5 per cent so that the total tonnage for August may decline to 1,092,000 tons. Since requests for plate allocations have declined somewhat, and some shipyards have been building up sizable inventories, the slight drop in plate production scheduled for August is not expected to disrupt shipbuilding.

Cincinnati Planer Co. to Sell Direct in the Northeast

• • • **The Cincinnati Planer Co.,** manufacturers of Hypro planers, vertical boring mills and planer type millers is now selling "direct" in New England, New York State, Northern New Jersey, and a part of Pennsylvania, from its Cincinnati office. Since 1899, this company was formerly served in those areas by Henry Prentiss & Co., Inc., which is now being dissolved. The Syracuse territory, however, will be handled by C. H. Briggs Machine Tool Co. The Cincinnati company will have competent sales engineers, service men and demonstrators direct from the Cincinnati office to serve its customers in the new northeast territory.

Erie Foundry Co. to Enter Machine Shop Business

Erie, Pa.

• • • **D. Angus Currie,** president, the Erie Foundry Co., announced that this widely-known foundry item producer is going out of the foundry business and will conduct a general machine shop business from now on. In accordance with this changeover, the company is constructing a two and a half million dollar plant.

Men and Machines for Second Front

RIGHT

ASSAULT BOAT: The engineer corps assault boat has an aluminum outboard motor.

LEFT

WALKIE-TALKIE: The private on the right is speaking into a walkie talkie, the army's portable field telephone with a range of three to five miles. The collapsible antenna, case and several other parts are of aluminum. Aluminum forms the reflector, housing and base of the searchlight in the center.

BELOW

FOOT BRIDGE: To make the engineers' foot bridge shown below, aluminum angled crescents filled with cork, such as the corporal is holding, are joined with the walkway by clamps. The "dog tags" shown are also aluminum.

ABOVE

RIBS AND SKIN: Aluminum forms the ribs of the three-seater training glider, above. The canvas skin is covered with aluminum paint.

PERSONALS . . .

• **James F. McNamara,** mill products sales manager of the International Nickel Co., has been made chairman of the board of directors of Harvill Aircraft Diecasting Corp. He joined the International Nickel Co. as a salesman 31 years ago, later becoming vice-president and general manager of the Monel Metal Products Corp.

• **William F. Sherman,** Detroit editor of THE IRON AGE for the past five years, has accepted an appointment as editor of "Production Information," a new publication to be issued by the Automotive Council for War Production, Detroit. Previous to Mr. Sherman's association with THE IRON AGE, he had been a member of the central department of the Chevrolet Division of General Motors Corp. Earlier he had served as a member of the staff of *The Detroit Free Press.* He is at present field editor of the SAE Journal and a member of the governing board of the Detroit Section, SAE.

• **Henry Fishbeck** has been transferred from the inspection department to the manufacturing department at Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford. Mr. Fishbeck will be responsible for materials processing.

• **Benjamin F. Parlett, Jr.,** has been named to the sales force of the Hanson-Van Winkle-Munning Co., Matawan, N. J.

• **Robert M. Kalb** has been appointed chief engineer of the Kellogg Switchboard & Supply Co., Chicago. Mr. Kalb was previously assistant chief engineer of the Kellogg company. Mr. Kalb is well-known for his research engineering work on transmission and circuit problems, and for 13 years was associated with the Bell Telephone Laboratories. **B. A. Wallace,** associated with the Kellogg laboratory and engineering department for many years, has been promoted to the position of assistant chief engineer.

• **George H. Kendall,** for the past six years senior commercial service engineer for the Norma-Hoffmann Bearings Corp., Stamford, Conn., resigned to devote full time to his professional consulting engineering practice on war problems of manufacturing investigations, fabrication processes and special machinery development and invention.

J. F. McNAMARA, chairman of the board, Harvill Aircraft Diecasting Corp.

• **James C. Tweedell,** export manager of the York Ice Machinery Corp., has been appointed general sales manager for the duration, succeeding **John R. Hertzler,** who will undertake a special assignment in a civilian capacity with the Army-Navy munitions board in Washington. **John Carr** has been named to replace Mr. Tweedell.

• **John J. Hughes** has been appointed manager of the St. Louis district for the Edison Storage Battery division, Thomas A. Edison, Inc., West Orange, N. J. Mr. Hughes succeeds **C. B. Archibald,** who was made district manager of the Pittsburgh office.

• **George Lowe** has been appointed supervisor, New Business Research, of the Carnegie-Illinois Steel Corp. Mr. Lowe is charged with the responsibility for coordinating the entire company effort to give vigorous effect to further broadening and diversification of its business as the soundest defense of its future position.

• **Dr. V. E. Wellman** has been appointed manager of the newly created chemical and pigments department of the purchasing division of the B. F. Goodrich Co., Akron, Ohio. Joining the B. F. Goodrich Company in 1929, Dr. Wellman worked on many projects in the chemical research department, and was made manager of the chemical laboratories in 1939. Two years later he became special technical assistant to T. G. Graham, vice-president in charge of manufacturing operations.

• **Douglas B. Rader,** designer and advertising consultant, has been named director of advertising for the Lindberg Engineering Co., Chicago. He replaces R. C. Onan who was recently made Lindberg's district sales manager in Milwaukee. **Robert S. Aitchison,** of the advertising department, has been appointed sales promotion manager of the company.

• **C. Granniss Bonner,** formerly comptroller and more recently treasurer of the Brunswick-Balke-Collender Co., Chicago, has been elected treasurer of Pomona Pump Co., Pomona, Cal. Mr. Bonner relieves **Donald C. McKenna,** vice-president, and former treasurer, who will devote full time to the increasing production activities of the company's four manufacturing plants.

• **David Logan** has been named district sales representative of the American Foundry Equipment Co., Mishawaka, Ind., with headquarters in Newark. **Frank W. Pedrotty** has been appointed to the Philadelphia sales office of the company.

• **R. Keeler** has been added to the Philadelphia sales staff of Cutler-Hammer, Inc., Milwaukee. Other additions to the district offices are: **J. E. McSorley,** Cincinnati; **J. A. Darnall,** New York, and **T. N. Bristow,** Seattle.

• **M. H. Wilson** has been named manager of sales, sheet division, Parkersburg Iron & Steel Co., Parkersburg, W. Va.

• **J. J. Boughey** has been appointed district supervisor of safety and **A. D. Sweeney** has been made director of safety at the South Works of Carnegie-Illinois Steel Corp.

• **Walter F. Wright** has been appointed liaison officer for the War Production Board's Automotive Branch and Detroit region. Mr. Wright has been an executive in the automobile and machinery industries for more than 25 years.

• **Augustine L. Morris,** assistant treasurer of the H. B. Smith Co., Inc., Westfield, Mass., has joined the R. E. Morris Co., Hartford.

• **Clyde L. Coleman** has been appointed manager of the Houston District Office of the American Rolling Mill Co. Mr. Coleman takes over the office which is responsible for the company's sales activities throughout the state of Texas with the exception of the Texas Pan-Handle which is included in the Kansas district.

• **E. T. Corbus** has been elected president of the Uddeholm Co. of America, Inc., New York, to fill the vacancy made by the death of Gosta Lofberg.

• **C. D. Manning** has been appointed general sales manager of Kellogg Switchboard & Supply Co., Chicago. Mr. Manning joined the Kellogg company as executive assistant to the president early in 1940 after 13 years with the International Telephone & Telegraph Corp.

• **Neill Hutchings,** comptroller of the Tennessee Coal, Iron & Railroad Co., Birmingham, leaves its services today under the retirement plan of the United States Steel Corp., after a continuous service of 47½ years. Mr. Hutchings will be succeeded by **John Pugsley,** who goes to the Tennessee company from National Tube Co., of Pittsburgh, another subsidiary of the United States Steel Corporation.

• **William S. Shipley,** chairman of the board of the York Ice Machinery Corp., York, Pa., has been appointed director and vice-chairman of the War Production Board's Small War Plants Corp. The appointment, which was announced recently by Donald M. Nelson, WPB chief, recognises Mr. Shipley's ability as author and prime mover of the York Plan for bringing small plants into war production.

• **Robert D. Macdonald** has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he has been assigned to the materials beneficiation division.

• **Samuel R. Robinson,** foundry metallurgist for the past 8 years for the Otis Steel Co., Cleveland, now Jones & Laughlin Steel Corp., has resigned to accept a position as works manager with the Valley Steel Castings Co., Bay City, Mich.

• **John W. O'Leary** has resigned as chairman of the executive committee of the United States Chamber of Commerce to give his full attention to war production work. Mr. O'Leary, among other business connections, is chairman of the board of Arthur J. O'Leary & Son, Co., Chicago, steel products manufacturers. Mr. O'Leary will continue as a chamber director at large, to which position he was re-elected for a two-year term in 1941.

• **H. S. Landon** for the past eight years, Chicago and western district sales manager for the Ohio Ferro-Alloys Corp., has been transferred to the general office, Canton, Ohio, as general manager of sales. **B. A. Patch** will be in charge of the Chicago district office.

• **R. L. Clarkson,** New York banker and chairman of the board of directors of the American Express Co., has been elected a member of the board of directors of Republic Aviation Corp., Farmingdale, N. Y.

OBITUARY . . .

• **Henry G. Reist,** retired head of the motor and generating engineering department of the General Electric Co., died July 5, in Schenectady, after a short illness. He was 80 years old. In 1889, after serving as assistant superintendent of the Harrisburg Foundry & Machine Co., in Pennsylvania, he joined the Thomson-Houston Electric Co. at Lynn, Mass. In 1894 he took charge of designs for alternating current machinery for General Electric. He retired in 1931.

• **Alexander H. Scott,** electrical engineer with Fairbanks, Morse & Co., Beloit, Wis., for the past 31 years, died, aged 63 years.

• **Max Schmerling,** operator of a metal and salvage shop in Milwaukee, died July 14. He was 63 years old.

THE LATE F. W. Jaeger, whose death was announced in these columns last week.

• **Andrew Fellows,** storekeeper for the Allis-Chalmers Mfg. Co., Milwaukee, for 36 years, died at his home in that city, July 13.

• **S. Houghton Cox,** vice-president and a director of Cleveland Twist Drill Co., Cleveland, died in Pasadena, Cal., July 12. After being graduated from Williams College in 1905, Mr. Cox went to work in Cleveland Twist Drill Co., which was founded by his father, Jacob D. Cox, II, in 1876. His brother, Jacob D. Cox, III, is president of the company.

• **Harry L. Keetch,** for several years an electrical engineer for Warner & Swasey Co., died July 13, aged 52 years.

• **W. W. Anderson,** for two years domestic sales manager of the Nicholson File Co., Providence, died on July 18, after a short illness. Mr. Anderson's affiliation with the Nicholson File Co. began in Canada after the first World War and he had been with the firm in Canada and the United States since. He became an employee of the Nicholson File Co. at Port Hope, Ont., and worked up to sales manager of the Canadian works, a post he held five years before going to Providence, in 1940, to assume the position he held at his death. He was also a director of the company.

• **James C. Alley,** of the James C. Alley Co., New York, pig iron merchant died, aged 78 years. Mr. Alley started in the pig iron business in 1878 and had been active until his death.

• **James F. Bowe,** who in 1907 became a partner in the A. M. Chapel Machine Co., Pittsfield, Mass., died July 20, aged 79 years. He was an authority on metallurgy and foundry science and author of Foundryman's Handbook.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Tool Builders Need Higher Priorities to Get Steel

Cleveland

• • • **The pinch in** the steel supply is becoming of grave concern to machine tool builders in this area. Already there have been spot cases of companies who have been unable to secure deliveries of small quantities of steel castings and other items from warehouses, while several of the important machine tool builders have been, upon more than one occasion, on the verge of serious curtailment in operations, avoided only at the last minute. Since the steel situation is growing progressively worse, machine tool builders fear that some severe shortages will be at hand in the near future. There is even some speculation to the effect that the government may curtail machine tool production in order to divert such steel into direct war materials such as shells, gun tubes, aircraft equipment and other vital items.

Complicating the steel situation for the industry at this time is the fact that for the most part orders on the books of machine tool producers carry A-1-a ratings with "urgency standing" numbers. This scheme has been very helpful in determining the sequence of deliveries of machine tools, so that when the new AAA, AA-1 and AA-2 ratings were issued a short time ago Washington is reported to have assured the industry that it need not concern itself over the new ratings. Despite this, it is reported that a number of the federal war agencies have been using the new ratings, thereby complicating the urgency standing scheme of distributing machine tools.

To make matters worse, machine tool builders find that they will have a difficult time securing steel deliveries from the steel mills on an A-1-a rating. Since the steel mills are beginning to get jammed on AAA, AA-1 and AA-2 ratings, the machine tool industry will stand small chance of getting sizable quantities of such items as bars, plate, shapes and even sheet and strip.

SPRINGS FOR TANKS: The recently reconditioned Chicago Heights plant of American Locomotive Co., in addition to other tank parts, makes these volute springs for light and combat tanks.

Allocations Cause Worry In Purchasing Field

Cincinnati

• • • **While there has been no definite** dislocation yet, the allocation system is causing procurement departments of many district machine tool builders to be disturbed about the future possibilities of obtaining materials. These men indicate that some inventories are on hand to take care of immediate production, but are expressing concern as to the possibility of getting materials when present supplies run out. In fact, in one or two instances it was the feeling that unless the situation is definitely ironed out by the time current supplies are exhausted, a retardation in the output is likely.

A second difficulty as a result of the allocation shift has been the need for completely changing order boards in many of the district plants. This has arisen by virtue of lowering of priorities on some machines that had already been scheduled on production lines and the sudden raising of priorities on ones that had not yet started through. Manufacturers have been working their forces overtime in an effort to correct their production schedules.

While new business does not flow in in the tremendous volume of last April and May, manufacturers indicate that it is still outdistancing cancellations.

Machine Tool Dealer Firm At Cleveland Changes Hands

Cleveland

• • • **Strong, Carlisle & Hammond Co.,** machine tool dealer organization with offices in Cleveland and Detroit, has been sold to the Central Illinois Co., of Chicago, for $1,750,000. The new owners took control of the company on July 24, but announced that the present management and some 350 employees will remain with the company for the present. At the time of the sale, George J. Zimmerman was president but has been inactive recently due to illness. The new Central Illinois Co. is headed by C. Russell Feldman, president of the International Machine Tool Corp., Elkhart, Ind.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

WPB Restricts All Imports of Silver

• • • **All silver imports,** including ores, bullion, concentrates, coins, compounds and semi-processed items were placed upon WPB's restricted importation list on July 22. Silver hereafter may not be purchased for importation, nor may new contracts be made by private importers except by special authorization. Existing private contracts are allowed to stand. After silver is imported, the owner cannot sell, process or move it beyond the place of initial storage, without special permission. Imports can be sold to Government agencies, however.

Available figures for foreign production of silver in 1941, compared with 1940, were:

	1941	*1940*
	Millions of Ounces	
Mexico	79	86.3
South America	28	30
Canada	22	25.4
Central America and West Indies	4.5	4.5

United States output of silver in 1941 was 70 million ounces, compared with 67 million in 1940.

Formation of a silver producers' industry advisory committee and a silver distributors industry advisory committee was announced July 23 by WPB. R. J. Lund, chief of the Miscellaneous Minerals Branch, is government presiding officer of both committees.

The Canadian government has granted an expansion program permit to Granby Consolidated Mining, Smelting & Power Co., to produce approximately 3,700,000 pounds of copper annually, a 10 per cent increase over its current rate. The government will advance $200,000 to the company, pending completion of negotiations by which the United States Metals Reserve Corp. will finance the opening of new Canadian base metal mines and the development of existing Canadian production.

Thousands of tons of zinc and lead ore now immobilized in mine pillars are expected to be brought into production with the aid of sensitive hearing instruments developed by the Bureau of Mines. Bureau engineers have recently removed several pillars in the tri-state district of Missouri, Kansas and Oklahoma, and plan soon to remove 13 more pillars in one mine, containing 30,000 tons of ore two and a half times richer than the mine's average.

General Electric Co. has reduced its normal tin requirements 50 per cent, largely through use of silver in alloys. . . . Major Russian copper deposits and refineries are all considerably behind present battle lines. Russia's copper production is about a sixth as large as ours. . . . U. S. Geological Surveys verify the presence of substantial quantities of quicksilver ore in Oregon.

Washington hears that Japan plans to develop rich aluminum deposits in Korea, Formosa and Manchuko. . . . Thailand's tin output of 19,000 tons annually presumably is more than filling Japan's needs, according to a *New York Times* cable. . . . Increased detinning capacity has prompted Washington to extend the tin can salvage program to 104 additional cities. . . . Magnesium and aluminum recovery methods and processing of tungsten, chromium, manganese and vanadium will be studied by 50 metallurgists at Northwest Electro - Development Laboratory, a $500,000 Bureau of Mines plant to be located near Bonneville and Grand Coulee.

Non-Ferrous Prices

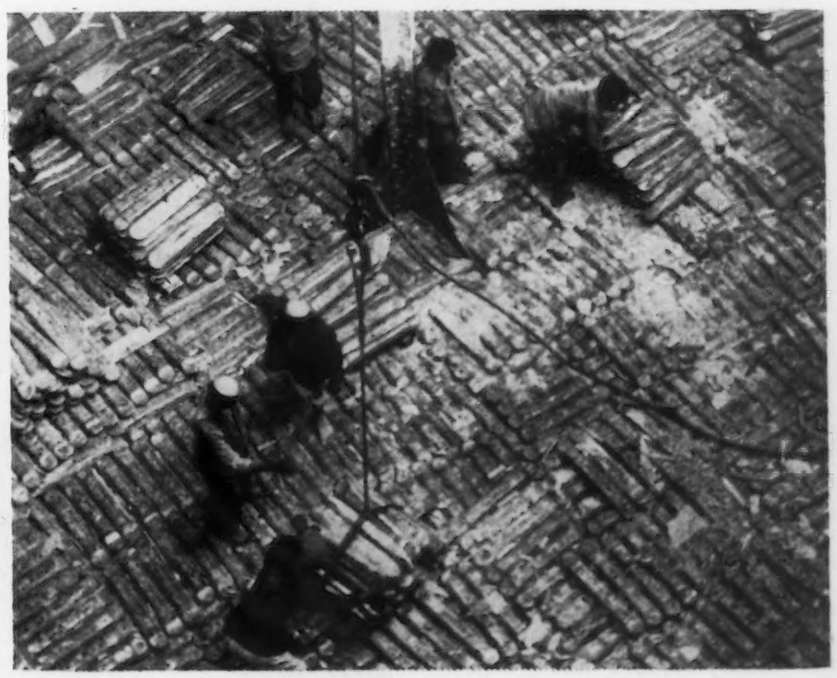
(Cents per lb. for early delivery)	
Copper Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead St. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal, New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

LEAD INGOTS FOR RUSSIA: Allied war supplies are pouring into Russia in ever increasing quantities, via Bandar Shahpor and the Trans-Iranian Railway. Transported across salt marsh and desert to Ahwaz, road and rail convoys there join the flow of supplies proceeding up river from Kharramshah and Bushire, all thence continuing northward to the U.S.R.R. Photo shows shipment of lead in the form of ingots of 65 lb. each, being unloaded on wharf at Bandar Shahpor.



SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Movement Holds Up, Supporting High Rate

• • • **As the nation's** scrap collectors and brokers continued operating in high gear, the government in the past week issued more statements on iron and steel scrap than probably any other single commodity.

The principal reward of the scrap trade was the satisfaction of seeing the ingot rate remain high, although it was affected slightly by repairs to equipment. Meanwhile, OPA came out with a statement Monday that it would not increase scrap price ceilings. The WPB at the same time set a six-month goal of 17 million tons of scrap iron and steel to be collected under the nationwide salvage program.

Summarized, other events of the past week included:

Report on June consumption by the Institute of Scrap Iron & Steel Inc., showing 4,608,000 gross tons used, with total consumption for the half-year at 27,843,000 tons, an all-time record. The six-month total included 15,300,000 tons generated in steel mills and foundries and 12,500,000 tons supplied by dealers.

Announcement by WPB of a new technical advisory board to the Industrial Salvage section; an enlarged tin can collection program; statements emphasizing the need for better transportation facilities in connection with the new national scrap drive.

Meanwhile, OPA cracked down in various ways upon more dealers at Chicago, St. Louis and Youngstown.

In brief, the district reports this week indicate the need for a number of improvements in the scrap setup. In some areas, local ordnances prevent "junkies" from operating efficiently. The rivalry between Army Ordnance officials and WPB men to get scrap appeared keener, with a few dealers in some areas seeming to hold the inside track to the exclusion of others. Clarification of the price structure surrounding slag and skull grades of scrap was reported badly needed. The subject of grading is still a very sore spot over the nation. OPA decisions which are sometimes based on a few pieces of misgraded material in a carload have upset the trade in particular. More reliance upon the judgment of scrap-hungry steel mills is preferred by both sellers and consumers.

Ed Solomon of the Max Solomon Co., Pittsburgh, proposes the idea that air raid wardens throughout the country be used in connection with the national scrap drive, with the thought that they might interview personally people in their areas, explaining to them the fundamentals of the drive and why the scrap collection is so important. Mr. Solomon's plan would include establishment of a central telephone exchange where operators would receive calls by persons holding the scrap and note the location of each call on a map dividing each area into a number of sections which would be under the jurisdiction of various scrap dealers. When a sufficient number of scrap calls had been received at the exchange for a particular area, the dealer would be notified, and he in turn would notify the junkies to cover the area in question.

Has No Interest in Scrap Firm

• • • **No financial** or directive interest in the Kentucky Steel Baling Co. is maintained by Andrews Steel Co. or Andrews Steel Defense Corp., it was stated by Joseph B. Andrews, Jr., last week. His statement clarifies an item which appeared in the July 9 issue of this magazine in connection with the formation of the new scrap concern.

Rumors of $2 Boost Unfounded, OPA Says

Washington

• • • **Recent press** reports suggesting a necessity for a $2 a ton increase in OPA's iron and steel price ceiling were described on Monday by D. P. Kennedy, price executive of OPA's Iron and Steel Branch, as being "utterly without foundation and seriously detrimental to the war effort."

Concerned over the "possible trade repercussion" to such "irresponsible" rumors, OPA and WPB officials met Monday to discuss possible action to counteract reports which created in some quarters the erroneous impression that such an increase is forthcoming.

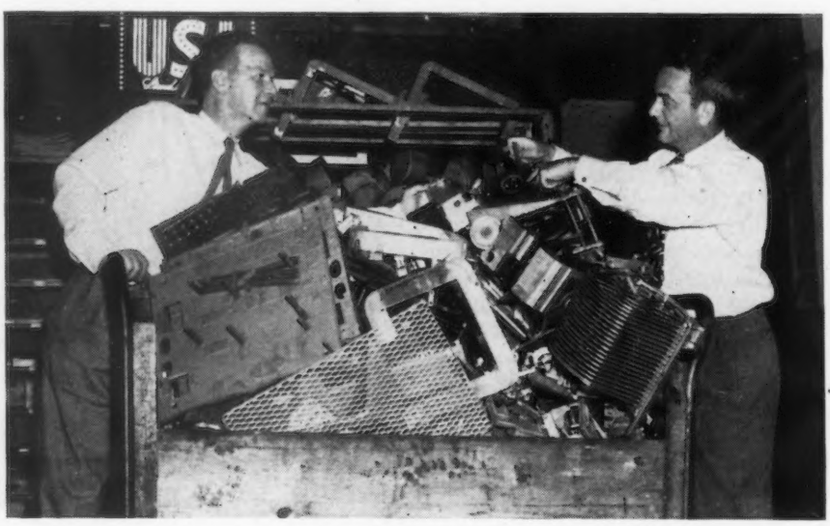
"These reports hamper the war effort," Mr. Kennedy commented.

Over Ceiling Scrap Sales Charged by OPA

Washington

• • • **Warnings and formal** charges against scrap dealers for exceeding price ceilings and violations of the Emergency Price Control Act were made by OPA this week to Chicago and St. Louis firms. The Chicago Metals Co.,

FROM JUKE BOX TO CHARGING BOX: A part of the 1000 tons of metal parts, tools, and machinery used in peacetime manufacture that is being turned over to the government at scrap metal prices by the Mills Novelty Co., Chicago. Bert Mills (left) war coordinator of the Mills plants, and Herbert Mills, general factory manager, examine some of the metal.



Chicago, was warned that further sales will result in proceedings for the suspension of the company's license, while at St. Louis violations were alleged in a complaint brought in U. S. District Court against Hyman Cohen, trading as Standard Steel and Rail Co.; Louis J. Silberman, trading as Silberman Iron & Metal Co.; Granite City Steel Co., and the Banner Iron Works.

The Wilkoff Co., Inc., Youngstown, has been charged in injunction proceedings filed by OPA, with setting up a "dummy" operating company. The company's counsel denied that any violation of the scrap price ceiling had been made.

•

CHICAGO—The scrap situation here shows little change. The current movement is sufficient to support present operating rates, but no stock building is possible. No furnaces are reported down this week for lack of scrap, the decline in the week's rate here being due entirely to repairs.

•

ST. LOUIS—Despite continued decreasing of the receipts of scrap in this market, mills continue to operate at high rate, although drawing on their reserve piles to do so. Shipments from country dealers have fallen off, as has the movement from the farms by trucks because help is needed in the fields.

•

PHILADELPHIA—There is no change in the tight situation in steel mill grades. Cast iron is easier after closing of many non-essential foundries. Mills are still dipping into inventories, and at least one reports operations will have to be curtailed soon if supply doesn't improve.

•

BUFFALO—The scrap movement continues at a fair pace as steel operations in the district this week reached the year's high. About 20 barges from the New York area reached the barge canal terminal here last week end, boosting scrap receipts considerably. Scrapmen are hopeful but not too confident that the forthcoming scrap drive will meet all expectations.

•

BOSTON—Two bottlenecks: Labor and government grading regulations, act as brakes on what might be a normal movement of scrap in New England. Wages paid yard labor range from 50c. an hr. up to around 66c. by small yards. Competent labor will not work for such wages when it can get 75c. to $1.50 an hr. for munition work. Inferior labor scrap sorting and grading invariably does not comply with OPA regulations. The du Pont representatives are scouring New England for borings.

•

CINCINNATI—Dealers see a gradual drying up of available scrap and, while they are skeptical over the Nelson drive, they hope that this effort will produce some new scrap sources. At present, production is being maintained by supplying material from the yards but the trend generally indicates that scrap is leaving yards faster than it is coming in. They, therefore, anticipate that the situation will become very tight within the next three weeks.

•

CLEVELAND—Although mills in this area report incoming scrap has been declining during the past ten days, observers state that Republic Steel has managed to build up inventories at three of its plants as winter reserves. Despite this, the company continues to face a critical situation in Warren, Canton and Massillon and at some of its plants it is reported that it is operating with a three days' supply ahead. The viaduct here, over which there has been considerable controversy in the method of its scrapping, is now expected to be scrapped this fall after the shipping season ends. It is pointed out that it would interfere with lake shipping if any work upon it were attempted now. Meanwhile, negotiations are being carried on to arrange for the removal of approximately 3000 tons of street car rail from various abandoned lines in Cleveland.

(Please Turn Page for Prices)

Scrap Fantasies

• • • "In the case of the 'clogged smelter,' a black marketeer adulterated his product and sold a bundle of iron and steel scrap with a high-grade outer layer covering a mass of useless brick, ash, junk, clay and other refuse. The customer was gypped, of course; but even worse, important smelters, clogged by the foreign matter, were put out of action. The very common use of top dressing in scrap trainloads is not only profit for the black marketer but grist for the 'saboteur's' mill."—Leo M. Cherne, writing on America's Black Market," in *Saturday Evening Post*, July 25.

"Let's also rip out unneeded fences and railings and, instead of using them to keep infants and dogs out of parks and gardens, use them to keep the Axis out of America by converting them into shells. (We can let Mayor La Guardia keep the 400-foot picket fences around Gracie Mansion for the present since Park Commissioner Moses has ruled that it is made from salvage scrap and could hardly be used over again.)"—From *New York Post* editorial.

MARVEL SAWS

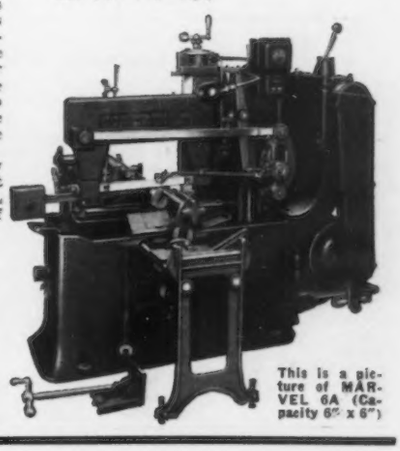
Hack Sawing the MARVEL Way is Metal Cutting the Most Economical Way!

There is no cheaper method for cutting off identical pieces from bar steel than with a MARVEL Automatic Production Saw because it provides:
1. Greatest number of pieces, floor to floor, per cost-dollar.
2. Lowest equipment and tool cost.
3. Minimum labor cost. Requires no more attention than an automatic screw machine.
4. Lowest chip loss (more pieces per bar).

The MARVEL System of Metal Cutting provides exactly suited equipment for the requirements of every shop or plant, as well as the non-breakable (composite) MARVEL High-Speed-Edge Hack Saw Blades, which permit far greater speeds, feeds and blade tension. This complete line of advanced equipment is changing shop practice and production methods everywhere by making sawing more economical and more efficient than other methods.

Your local MARVEL Sawing Engineer will gladly analyze your metal cutting problems and point out where you can cut costs with the MARVEL System or we will gladly send bulletin on any of the following:

1. MARVEL No. 1, Dry Cutting General Purpose Saw (4" x 4" cap.)
2. MARVEL No. 2, General Purpose Hack Saw (8" x 8" cap.)
4B. MARVEL No. 4B, Light Duty, High Speed Saw (6" x 6" cap.)
6. MARVEL No. 6, Heavy Duty, High Speed Saw (6" x 6" cap.)
6A. MARVEL No. 6A Automatic Production Saw with Automatic Bar Push-up (6" x 6" cap.)
8. MARVEL No. 8 Metal Cutting Band Saw (18" x 18" cap.)
9. MARVEL No. 9 Heavy Duty High Speed Saw (10" x 10" cap.)
9A. MARVEL No. 9A Automatic Production Saw with Heavy Duty Bar Push-up (10" x 10" cap.)
18. MARVEL No. 18 "Giant" Hydraulic Hack Saw (18" x 18" cap.)



This is a picture of MARVEL 6A (Capacity 6" x 6")

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales: 225 Lafayette St., New York

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap				
				Billet, Bloom, Forge Crops	Bar Crops, Punchings, Plate Scrap and Cast Steel	Tube Scrap	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under and Auto. Springs, and Crankshafts	Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$23.00	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.75	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	22.25	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	21.25	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	21.00	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.85	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.50	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	20.00	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.50	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.50	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, Conshohocken, 36c.; Atlanta, Birmingham, Pittsburg, Cal., 32c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington,	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	July 28, 1942	July 21, 1942	June 30, 1942	July 29, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	July 28, 1942	July 21, 1942	June 30, 1942	July 29, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Coppen, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	53.50
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 123 to 130 herein.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 28, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	LOW
1942	2.30467c.,	2.30467c.,
1941	2.30467c.,	2.30467c.,
1940	2.30467c., Jan. 2	2.24107c., Apr. 16
1939	2.35367c., Jan. 3	2.26689c., May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18
1937	2.58414c., Mar. 9	2.32263c., Jan. 4
1936	2.32263c., Dec. 28	2.05200c., Mar. 10
1935	2.07642c., Oct. 1	2.06492c., Jan. 8
1934	2.15367c., Apr. 24	1.95757c., Jan. 2
1933	1.95578c., Oct. 3	1.75836c., May 2
1932	1.89196c., July 5	1.83901c., Mar. 1
1931	1.99629c., Jan. 13	1.86586c., Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1942	$23.61	$23.61
1941	$23.61, Mar. 20	$23.45, Jan. 2
1940	23.45, Dec. 23	22.61, Jan. 2
1939	22.61, Sept. 19	20.61, Sept. 12
1938	23.25, June 21	19.61, July 6
1937	23.25, Mar. 9	20.25, Feb. 16
1936	19.74, Nov. 24	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71 May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	HIGH	LOW
1942	$19.17	$19.17
1941	$22.00, Jan. 7	$19.17, Apr. 10
1940	21.83, Dec. 30	16.04, Apr. 9
1939	22.50, Oct. 3	14.08, May 16
1938	15.00, Nov. 22	11.00, June 7
1937	21.92, Mar. 30	12.92, Nov. 10
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, Apr. 29
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢[14]			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(11)		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

DISSTON SPECIALISTS KNOW THE ART AND SCIENCE OF MAKING FINE TOOL STEELS

A group of skilled artisans, each a specialist, make Disston Tool Steels. Behind these men are standards of quality covering 87 years of pioneering and progress in steel manufacture. Today expert metallurgists and chemists supervise and control every step in the Disston processes.

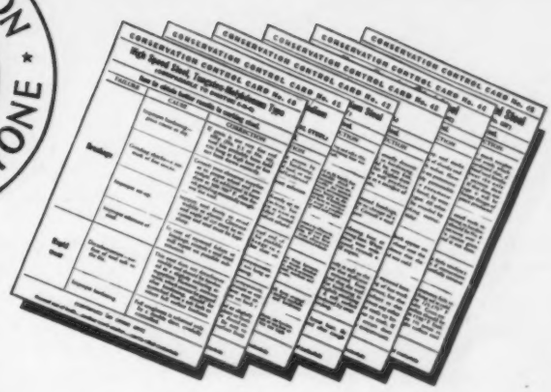
They have at their command the most modern facilities and practices. Only selected scrap and the purest materials are employed. Charges are melted in Heroult arc furnaces. Forging, rolling, annealing or hardening are careful processes, expertly done.

Disston specialists, with accurate metallurgical control, can create precisely made alloy and carbon steels with predetermined grain size, exceptional soundness and extraordinary cleanliness . . . Consider such a superior Disston Tool Steel as Croloy—highly resistant to both sliding and impinging wear, with good air hardening qualities . . . an excellent steel for dies, punches and many high production tools.

These men know tool steel: The Disston technical staff will gladly help you select the best steel for long tool life and better work. And if you have not received a free copy of the illustrated 73-page book, "Disston Tool Steels," write today to Henry Disston & Sons, Inc., 719 Tacony, Philadelphia, Pa., U. S. A.

• INSTRUCTION CARDS

As a part of the nationwide Disston Conservation Control Plan, free instruction cards on the working of six different types of tool steels will be supplied on request. Join the War on Waste! Write for these cards *now*.



SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton $54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.53*	*$25.03*	*$26.53*	*$26.03*	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27.62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT									Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35	.....	.....	.10/.20	.....	.45c	$ 9.00	.95c	$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35	.....	.....	.25/.35	.....	.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35	.....	.....	.20/.30	.....	.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.40/.60	.....	1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54. per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

Planes are Forgings

Trainers, pursuits, bombers, flying fortresses—they're faster, more durable and better able to withstand the gruelling punishment of long distance flights and the rigors of combat because of the broader use of tough, stress resistant forged parts. Wing, strut, fuselage, engine and bomb rack forgings are typical parts that we are producing for the aviation industry. Our production has grown, in one short year, from a few parts made for one plane builder to thousands of parts shipped daily—seven days a week to aviation companies all over the country.

We're in this war to win—and if we can help you with forgings for planes, tanks, ships, guns or machine tools, we'll find some way to expand our already over-taxed production facilities.

We're beating plow shares into swords—for democracy.

Proudly we fly the Navy "E" flag awarded for excellence and proficiency in the production of Naval Materiel.

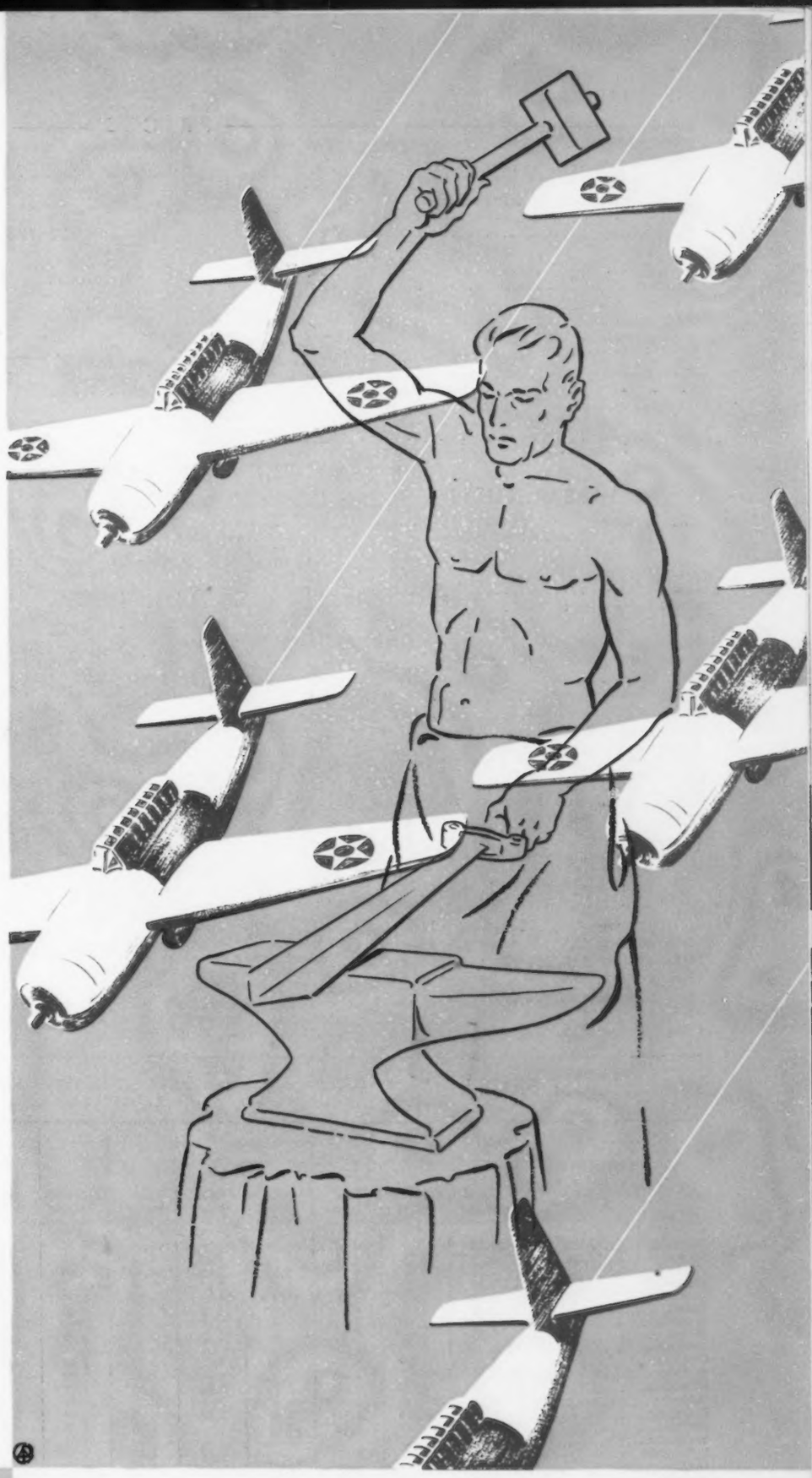
KROPP FORGE COMPANY

Makers of Drop, Upset and Hammer Forgings for Guns, Planes, Tanks, Ships and Machine Tools.

"World's Largest Job Forging Shop"

5301 W. ROOSEVELT ROAD, CHICAGO, ILL.

Representatives in Principal Cities



SERVING INDUSTRY SINCE 18 37 KROPP FORGE CO. OVER 100 YEARS

KROPP

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets *(7/16 in. and smaller)*

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws *Per Cent Off List*

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

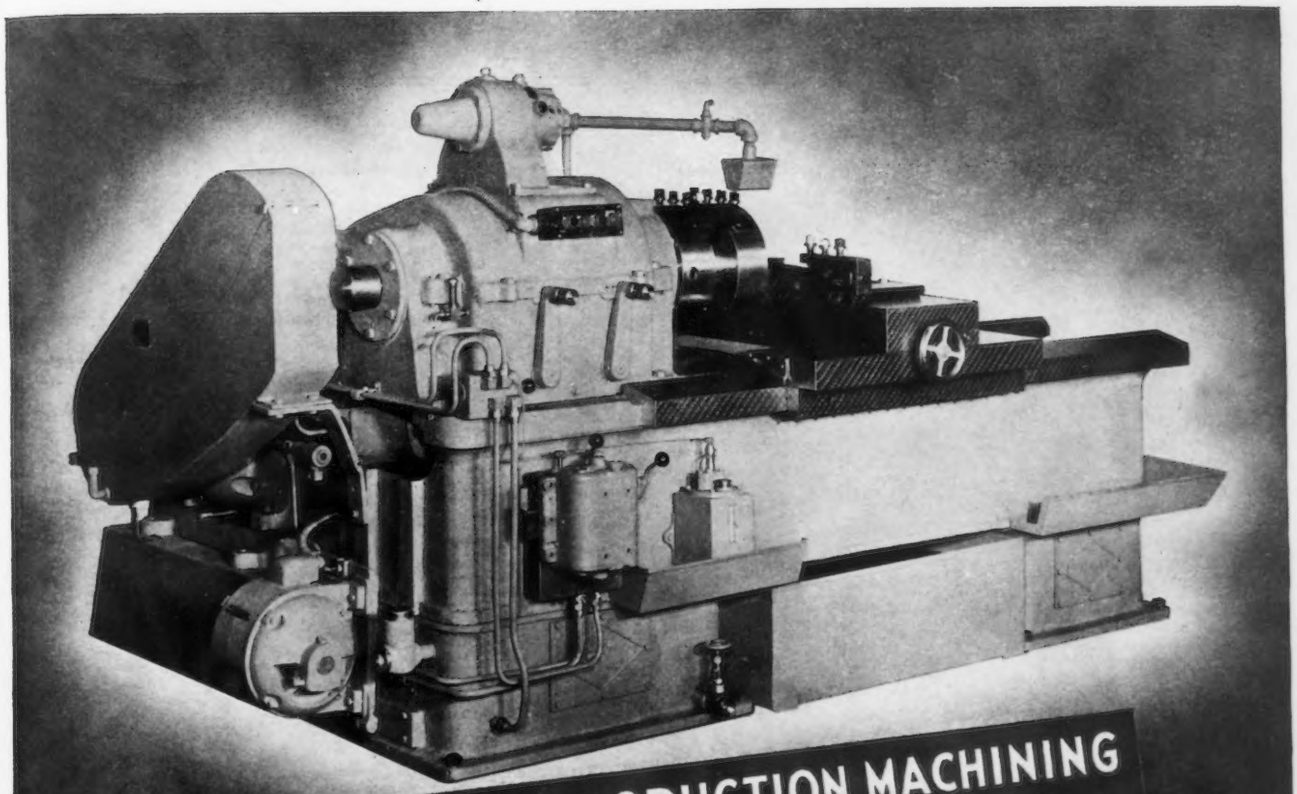
F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	....	$4.65	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05[5]	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.68*	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45[3]	....	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.48	....	....	....	....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	....	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati	3.42	4.37[2]	4.42[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	....	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington	3.60	....	....	4.10	....	3.80	3.80	3.95	4.10	....	....	....	....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	....	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis	3.85	....	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	4.05	....	....	4.30	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	4.00	....	....	4.30	....	4.05	4.05	3.75	....	....	....	....	....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†	4.55	7.05	6.10	4.50	....	4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle†	4.65[7]	....	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	9.00	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.



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BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	60-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$36.00
Domestic, 26 to 28%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon	$113.00*
2.50 carbon	118.00*
2 carbon	123.00*
1 carbon	133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.

**Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FLUORSPAR

Fire Clay Brick	*Per Net Ton*
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00
Foreign, 85% calcium fluoride, not over 5% Ci, c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$34.00
As above, in bags, f.o.b. same mines	36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania	$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester	$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester Pa.	54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Foreign Ores**

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

	Per Unit
African, 46-48 Mn	70c.-75c.
Indian, 48-50 Mn	75c.
Brazilian, 46-48 Mn	81c. to 83c.
Cuban, 51 Mn	85c.
	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$24 to $26
Tungsten, domestic scheelite, at mine	$24 to $25
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)	$28 to $30
Rhodesian, 45	Nom.
Rhodesian, 48	Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

	Per Net Ton
†Connellsville, prompt	$6.00

Foundry

†Connellsville, prompt ....$6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

FUEL OIL

No. 6 Bur. Stsd., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.